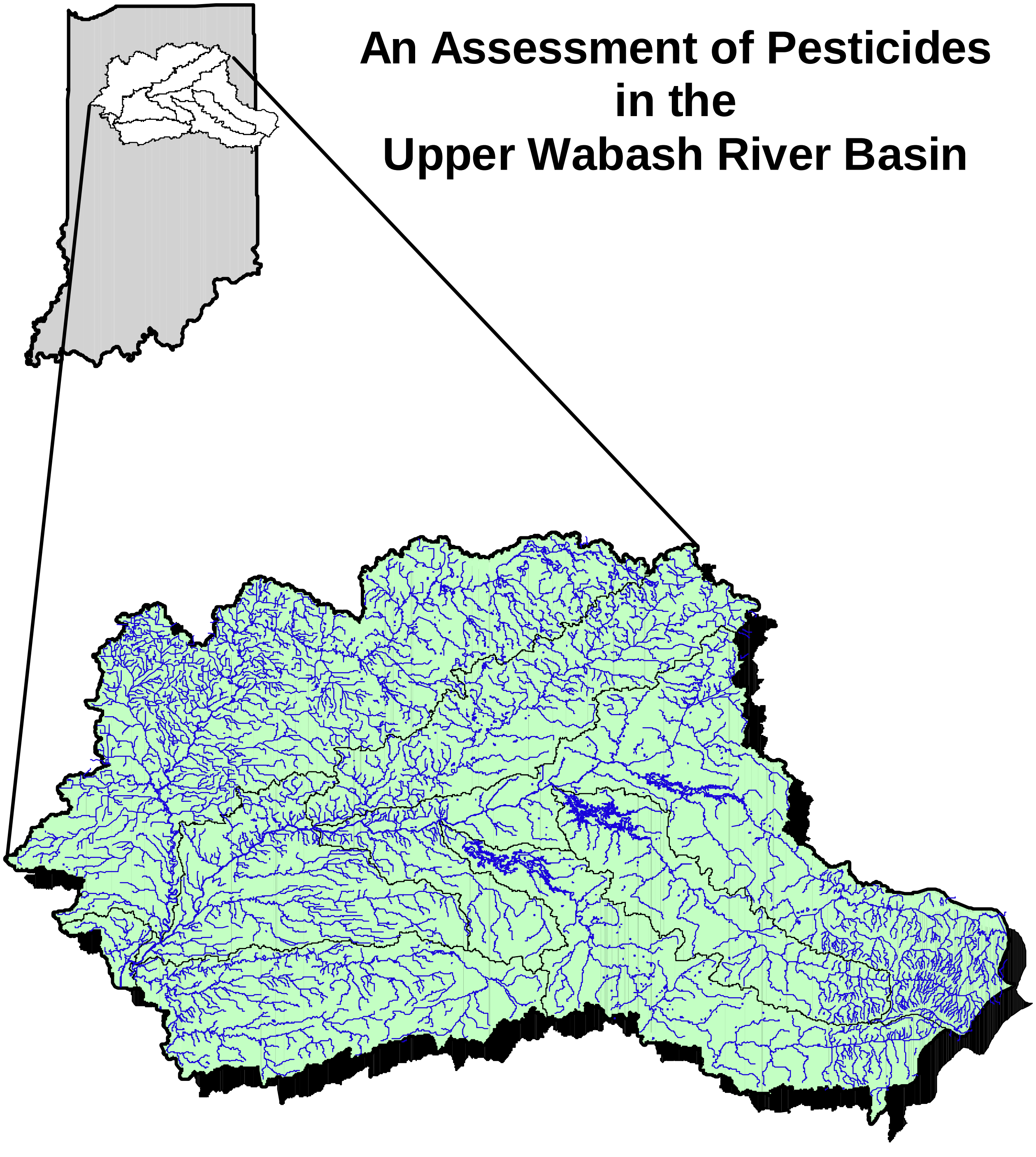
An Assessment of Pesticides in the Upper Wabash River Basin



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An Assessment of Pesticides in the Upper Wabash River Basin

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INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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Abstract

This study continues IDEM's Pesticide Monitoring Program. Surface water samples from the Upper Wabash River Basin were analyzed for 142 pesticides, pesticide degradation products, and urban chemicals during April 1 through July 31, 1998. This time period was selected to represent the season when pesticide application is occurring most often. There were 22 sampling sites located along the main stem of the Wabash River and eight tributaries. The test method used to analyze these chemicals was SAS5 Modified EPA Test Method 525.2. All sampling sites were sampled once a week for 15 weeks resulting in the collection of approximately 330 water samples. Of the 142 chemicals analyzed 110 are pesticides or 77.4%. Of these 110 pesticides only 19 were detected over their respective detection limit. Herbicides represented 13 of the pesticides detected in the surface water or 68.4%. Atrazine, metolachlor, and acetochlor were the most represented pesticides. The maximum concentrations recorded for a single sample for the three herbicides were:

- atrazine, 36 ug/L on June 11 at Mississinewa River near Ridgeville;
- metolachlor, 41 ug/L on June 11 at the same location;
- acetochlor, 14 ug/L on May 20 at Mississinewa River near Ridgeville, and May 21 at Eel River near Logansport.

The average concentration during the 15-week sampling season for atrazine, metolachlor, and acetochlor was, respectively, 3.31 ug/L, 2.17 ug/L, and 1.04 ug/L. With no surface water standards set for these pesticides, comparison to the Drinking Water Standards maximum contaminant level (MCL) seems appropriate. The MCL set for the three herbicides are atrazine, 3.0 ug/L; metolachlor, no MCL set; and acetochlor, 2.0 ug/L.

Using U.S. Geological Survey gaging station flow data and mathematical calculations, total pounds of pesticide loading was determined. Using Geographic Information Systems to define crop acreage in each watershed, application rates of pesticide, and the pesticide loading in pounds, an estimate of percent runoff was determined. Percent runoff for atrazine, metolachlor, and acetochlor was, in respective order, 1.14%, 1.20%, and 0.49%.

Three surface water intakes for drinking water are located in this watershed basin. They are located on Center Lake at Warsaw, Eel River at Logansport, and Wildcat Creek at Kokomo. It is envisioned that information gathered here on the occurrence of pesticides in the Upper Wabash River Basin will be useful for IDEM's Surface Water Quality Monitoring newly implemented Source Water Protection Program to protect the environment and human health.

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Acknowledgments

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INTRODUCTION

This pesticide monitoring effort identifies the concentrations and loading of pesticides used in the Upper Wabash River Basin. The 1998 pesticide monitoring program in ambient water was conducted with the following objectives in mind:

1. Identify the occurrence and amount of selected pesticides and semi-volatile chemical compounds in surface waters of the Upper Wabash River Basin.

2. Provide benchmark information for long-term trend analysis and correlation with other ambient monitoring programs within the State.

3. Determine which tributaries contribute the greatest pesticide load to Upper Wabash River Basin.

4. Compare pesticides loading from individual sampling sites.

STUDY AREA

LOCATION

The Wabash River originates in northwestern Ohio. After crossing the Indiana state line near New Corydon in Jay County, Indiana, it cuts westward across the state; then heads south to eventually form the border between Indiana and Illinois. For the ease of management, the Indiana Department of Natural Resources divided the Wabash River into three subbasins. These three divisions are the upper, middle, and lower subbasins. This project focuses on the Upper Wabash River Subbasin. This section extends from the Indiana-Ohio border downstream to include Wildcat Creek near Lafayette. The dimensions for the Upper Wabash River Basin are approximately 110 miles east-west by 70 miles north-south (Greeman 1994).

GEOLOGY

The Upper Wabash River Basin primarily consists of glacial drift with a few areas of out cropping Paleozoic bedrock. The bedrock has five apparent classifications: Silurian Dolomite and Limestone, Devonian and Mississippian Shale, Devonian Limestone and Dolomite, Mississippian Siltstone and Shale, and Ordovician Shale and Limestone. The majority of the bedrock is composed primarily of the Silurian Dolomite and Limestone. Layered above the bedrock are three physiographic units: Tipton Till, Steuben Morainal Lake Area, and the Kankakee Outwash and Lacustrine Plain. If the Upper Wabash River Subbasin area were divided equally into a northern and southern half, the southern half would be completely Tipton Till. Also, located in the southern portion are three major moraines: Wabash, Salamonie, and Mississinewa Moraines. The northern half is basically split into thirds with the eastern third being Tipton Till, the middle third being Steuben Morainal Lake area, and the western third being part of the Kankakee Outwash and Lacustrine Plain (Greeman 1994). The Upper Wabash River from just downstream of Logansport has a slope of greater than 2.5 feet per mile to less than 1 foot per mile. Excess sediment loads washed into the Wabash River by the Eel and Tippecanoe Rivers have caused the loss of the slope (Greeman 1994). The long term annual precipitation in this region averages 37.5 inches per year (IDNR 1980). The average rainfall total for the surrounding climate areas of the Upper Wabash River Basin during 1998 was 42.6 inches (Scheeringa 1999).

LAND USE

The Upper Wabash River Basin contains 20% (7,278 mi^2) of Indiana's total land area. The land area is primarily represented by cropland (92% at 6,695.2 mi^2), forests (4% at 293 mi^2), and urban and industrial areas (2.4% at 173 mi^2) (USGS 1994).

FLOW & DRAINAGE

The Wabash River drains 32,910 mi^2 of Indiana, Illinois, and Ohio, and flows into the Ohio River and ultimately into the Mississippi River. The Upper Wabash River Basin includes the

Wabash River from beyond the Indiana-Ohio state line downstream to Lafayette. The Upper Wabash River Basin drains 7,278 mi^2 of which 285 mi^2 are in Ohio (Greeman 1994). Some of the major tributaries of the Upper Wabash River include: Tippecanoe River, Eel River, Mississinewa River, Salamonie River, Little River, Deer Creek, Pipe Creek, and Wildcat Creek (IDNR 1980).

EROSION POTENTIAL

The soil erosion potential for the Upper Wabash River area is rated as:

Low	63%
Medium	29%
High	9%

The upper portion of this basin has the least potential for erosion, and the lower portion has the highest potential (IDNR 1980).

MATERIALS AND METHODS

SAMPLING LOCATION

Sampling sites were selected because of their association with United States Geological Survey(USGS) gaging stations. These gaging stations provide instantaneous flow values, which are needed for determining pesticide loading in streams. A complete list of the sampling sites, the number assigned to the USGS gaging station, and the individual drainage areas, in square miles, is included in Table 1.

Table 1 Upper Wabash River Basin Pesticides Sampling Locations at USGS Gaging Stations

Site	Station	USGS Gage #	Drainage Area mi^2
TR-159	Tippecanoe River @ Oswego	3330500	116*
TR-79	Tippecanoe River near Ora	3331500	856
TR-9	Tippecanoe River near Delphi	3333050	1,869
DC-5	Deer Creek near Delphi	3329700	274
WB-311	Wabash River @ Lafayette	3335500	7,278*
WB-354	Wabash River @ Logansport	3329000	3,792*
WB-370	Wabash River @ Peru	3327500	2,700*
WB-387	Wabash River @ Wabash	3325000	1,772*
WB-409	Wabash River @ Huntington	3323500	725*
WB-445	Wabash River @ Linn Grove	3322900	457*
LR8	Little River Near Huntington	3323500	263
ELL-53	Eel River @ No. Manchester	3328000	384*
ELL-7	Eel River Near Logansport	3328500	789
S-30	Salamonie River Near Warren	3324300	425
S-3	Salamonie River @ Dora	3324500	557
MS-100	Mississinewa River near Ridgeville	3325500	143*
MS-36	Mississinewa River @ Marion	3326500	691*
MS-7	Mississinewa River Near Peoria	3327000	818*
PIP-11	Pipe Creek Near Bunker Hill	3327520	159
WC-80	Wildcat Creek Near Jerome	3333450	146
WC-60	Wildcat Creek @ Kokomo	3333700	242
WC-15	Wildcat Creek @ Owasco	3334000	396
WCS-4	S.F. Wildcat Creek Near Lafayette	3334500	243
WC-5	Wildcat Creek Near Lafayette	3335000	794

* Indicates different watershed values than published USGS values as described in the text.

In order to determine the area for specific land uses in each watershed, it was first necessary to delineate the watershed drainage area for each sampling site. Drainage areas for the sampling sites were located at gaging stations listed in this report may differ as much as 1% from published USGS values. These discrepancies can be attributed to scale differences in the digital coverage used to delineate the watersheds. Specifically, the portion of the Upper Wabash River Basin located in Indiana was delineated at the 14-digit HUC scale, while the contributing area in Ohio was delineated at the 8-digit HUC scale.

Maps displaying the watersheds sampled, sampling locations, stream identity and land usage are found in Appendix I.

SAMPLING METHODOLOGY

Sampling consisted of collecting surface water grab samples from the center of flow at each station. The grab samples were collected on a weekly basis, approximately seven days apart. A sample collection apparatus was fabricated with four inch diameter PVC pipe. Three pieces of pipe were cut to the size of the sample bottles and were connected together by plastic bolts. This allowed for the simultaneous collection of duplicate samples and Matrix Spike/Matrix Spike Duplicate samples during each sampling route. A rope was attached to this apparatus and lowered from a bridge to collect the samples at each location. The sample containers were acid rinsed, glass, amber one-liter bottles provided by the contract laboratory. The apparatus was lowered and raised throughout the depth of the water column. Before the samples were collected, the sampling apparatus and the outside of the sample bottles were decontaminated by rinsing with de-ionized water. Field data were collected at each site at the time of sampling. Field data parameters measured included dissolved oxygen (DO), pH, temperature, conductivity, and turbidity.

CHEMICAL ANALYSIS

All water samples were analyzed for pesticides using SAS5 Modified EPA test method 525.2. A detailed list of constituents is included in Appendix II. After collection, samples were preserved with hydrochloric acid, placed in ice, and transported to a contract laboratory where they were analyzed. Samples were not filtered before analysis. To ensure QA/QC requirements were met, a single duplicate water sample and a single Matrix Spike/Matrix Spike Duplicate were collected during each sampling route. All water samples qualified for Data Quality Assessment (DQA) level 3 (Appendix III) according to the Quality Assurance Project Plan (QAPP). Analytical results included QC check samples for each batch of samples from which precision, accuracy, and completeness were determined. Detection limits were determined using 40 CFR Part 136 Appendix B, Revision 1.11. Raw data, chromatograms, spectrograms, and bench sheets were not included as part of the analytical reports received by the investigators, but have been maintained by the Contract Laboratory for easy retrieval and review. Data falling under this category is considered as complete and is used for regulatory decisions (Appendix III).

QUALITY ASSURANCE MEASUREMENTS

Precision

Quality assurance for analytical precision was based on laboratory duplicates, Matrix Spike (MS), Matrix Spike Duplicates (MSD) and Relative Percent Difference (RPD). Overall precision of the study reported in Table 2 was 1.6% for Field Duplicates and 8.4% for MS/MSD, within the +/-30% established by the QAPP.

Accuracy

Quality assurance for analytical accuracy was based on MS/MSD and is reported in Table 3. The study average for % Recovery was 129.0 for MS and 129.9 for MSD, within the 70 – 130% limits established by the QAPP.

Table 2 Precision Measured in Duplicate Samples

		Acetochlor		Atrazine		Metolochlor	
Survey Week	**EHL Report #**	**Field Dupl RPD(1)**	**MS/MSD % RPD(1)**	**Field Dupl RPD(1)**	**MS/MSD % RPD(1)**	**Field Dupl RPD(1)**	**MS/MSD % RPD(1)**
3/31/98	315319-44		1.6		82.4 *		5.2
4/20/98	319227-53		4.3		7.0		6.2
4/27/98	320683-709		15.9	66.7	10.7	0.0	5.5
5/4/98	323308-33	22.2		66.7		13.3	
5/13/98	324374-400		8.9	28.6	7.4	22.2	3.1
5/20/98	326572-98	28.6	13.9	0.0	19.0	10.5	6.6
5/27/98	327461-86		12.7		4.2		9.5
6/3/98	328848-74	66.7	0.2	0.0	9.3	0.0	1.2
6/9/98	330586-621	7.0	3.6	5.4	1.9	7.6	9.3
6/17/98	331721-47	0.0	6.4	14.1	13.0	1.7	0.3
6/24/98	333517-42	0.0	5.5	7.4	14.0	0.0	6.1
6/30/98	334635-61	3.8	1.5	38.1	17.4	10.5	3.7
7/8/98	335928-54	0.0	1.2	6.9	7.2	4.9	1.9
7/8/98	337552-73						3.2
7/15/98	337574-600	18.2	6.5	0.0	3.2	0.0	9.3
7/21/98	339485-511		12.2	0.0	4.7	13.3	2.4
7/27/98	341880-912		4.9		9.9	0.0	1.3
	Parameter Average	**14.7**	**6.6**	**7.5**	**14.1**	**0.9**	**4.7**
	Study Average	**1.6**	**8.4**	**1.6**	**8.4**	**1.6**	**8.4**

(1) Relative Percent Difference

* indicates exceedance of ±30% RPD limits as established in the QAPP

Table 3 Accuracy Measured in Spiked Samples

Survey Week	EHL Report #	Acetochlor MS[1] % Recov	Acetochlor MSD[2] % Recov	Atrazine MS % Recov	Atrazine MSD % Recov	Metolochlor MS % Recov	Metolochlor MSD % Recov
3/31/98	315319-44	118.5	116.6	582.4 *	242.5 *	133.0 *	126.2
4/20/98	319227-53	106.3	111.0	89.0	96.7	116.6	124.1
4/27/98	320683-709	112.4	131.8 8	104.5	117.5	104.5	111.4
5/4/98	323308-33	71.5		61.5 *		52.9 *	
5/13/98	324374-400	108.8	120.5	86.3	75.2	92.9	88.4
5/20/98	326572-98	59.3 *	107.3	58.2 *	280.8 *	86.4	99.7
5/27/98	327461-86	75.2	93.6	-48.2 *	-39.5 *	50.0 *	65.4 *
6/3/98	328848-74	107.9	107.6	109.1	131.0 *	110.4	112.1
6/9/98	330586-621	115.9	120.6	100.1	102.9	114.1	127.4
6/17/98	331721-47	125.7	139.4 *	179.9 *	115.6	194.7 *	192.2 *
6/24/98	333517-42	112.4	97.7	268.2 *	99.8	133.5 *	98.0
6/30/98	334635-61	104.4	106.3	122.4	89.1	152.3 *	138.6 *
7/8/98	335928-54	108.3	106.8	100.5	85.4	127.9	133.0 *
7/8/98	337552-73					173.5 *	179.6 *
7/15/98	337574-600	155.7 *	166.1 *	491.0 *	509.0 *	159.8 *	182.9 *
7/21/98	339485-511	141.3 *	159.7 *	119.3	128.6	142.7 *	148.8 *
7/27/98	341880-912	112.3	117.9	95.2	86.2	120.6	122.6
	Parameter Average	**108.5**	**120.2**	**157.5**	**141.4**	**121.5**	**128.2**
	Study Average	**129.0**	**129.9**	**129.0**	**129.9**	**129.0**	**129.9**

(1) Matrix Spike
(2) Matrix Spike Duplicate
* indicates exceedance of % Recovery Limits of 70 – 130 % as established by the QAPP

SELECTED PESTICIDE NARRATIVES

The Upper Wabash River Basin is 92% cropland (USGS 1994). This can indicate heavy use of agricultural pesticide. Table 4 lists the selected pesticides along with their brand names, target crop, MCL, and the number of times that a pesticide was identified above the detection limit and the number of times it exceeded the MCL. The top ten pesticides used in Indiana were:

Table 4 Most Commonly Used Pesticides and Associated Information

Common Name	Brand Name	Crop receiving treatment	Detection limit/ MCL*	Number of hits above Detection limit/Above the MCL
Acetochlor	Harness and Surpass	Corn	0.1 ug/L 2 ug/L	260/45
Atrazine	Aatrex	Corn and Sorghum	0.1 ug/L 3 ug/L	342/95
Chlorpyrifos	Dursban, Empire, Lorsban, Brodan, Detmol UA	Can be used on all types of crops	0.1 ug/L NA	107/NA
Clomazone	Command, Commence, and Merit	Soybean	0.1 ug/L NA	88/NA
Cyanazine	Bladex and Fortrol	Corn, Sorghum, wheat	0.1ug/L NA	60/NA
Glyphosate	Roundup, Rodeo, Landmaster, Sting	Soybean	NA 700 ug/L	Not included in EPA test method 525.2
Metolachlor	Dual and Pennant	Corn, Soybeans, Potatoes and Sorghum	0.1 ug/L NA	352/NA
Pendimethalin	Prowl, Squadron, Stomp	Soybean	0.1 ug/L NA	2/0
Terbufos	Aragran, Conrtaven, Counter, and Plydox	Corn	0.1 ug/L 0.2 NA	0/NA
2,4-D	Justice, Lawn-Keep, Miracle	Soybean	NA 70 ug/L	Not included in EPA test method 525.2

*Maximum Contaminant Level (MCL) = MCL are set for finished drinking water, and are figured using a yearly mean concentration. These are not surface water standards. Currently there are no surface water standards established for the listed pesticides in unfinished surface water. The MCL is just used as a reference point in this case.

N/A – not applicable. MCL has not been established.

The National Agricultural Statistics Service (NASS) reports that 7.05 million pounds of atrazine, 4.92 million pounds of metolachlor, 3.63 million pounds of acetochlor, and 1.09 million pounds of cyanazine were applied to 5.8 million acres of corn in Indiana during 1998. In addition, 2.68 million pounds of glyphosate, 1.0 million pounds of pendimethalin, 0.58 million pounds of 2,4-D, and 0.43 million pounds of metolachlor were applied to 5.7 million acres of soybeans in 1998 (NASS 1999). Figure 1 represents the data provided by NASS by listing the percent of an individual pesticide pounds to the sum all the reported pesticide pounds applied.

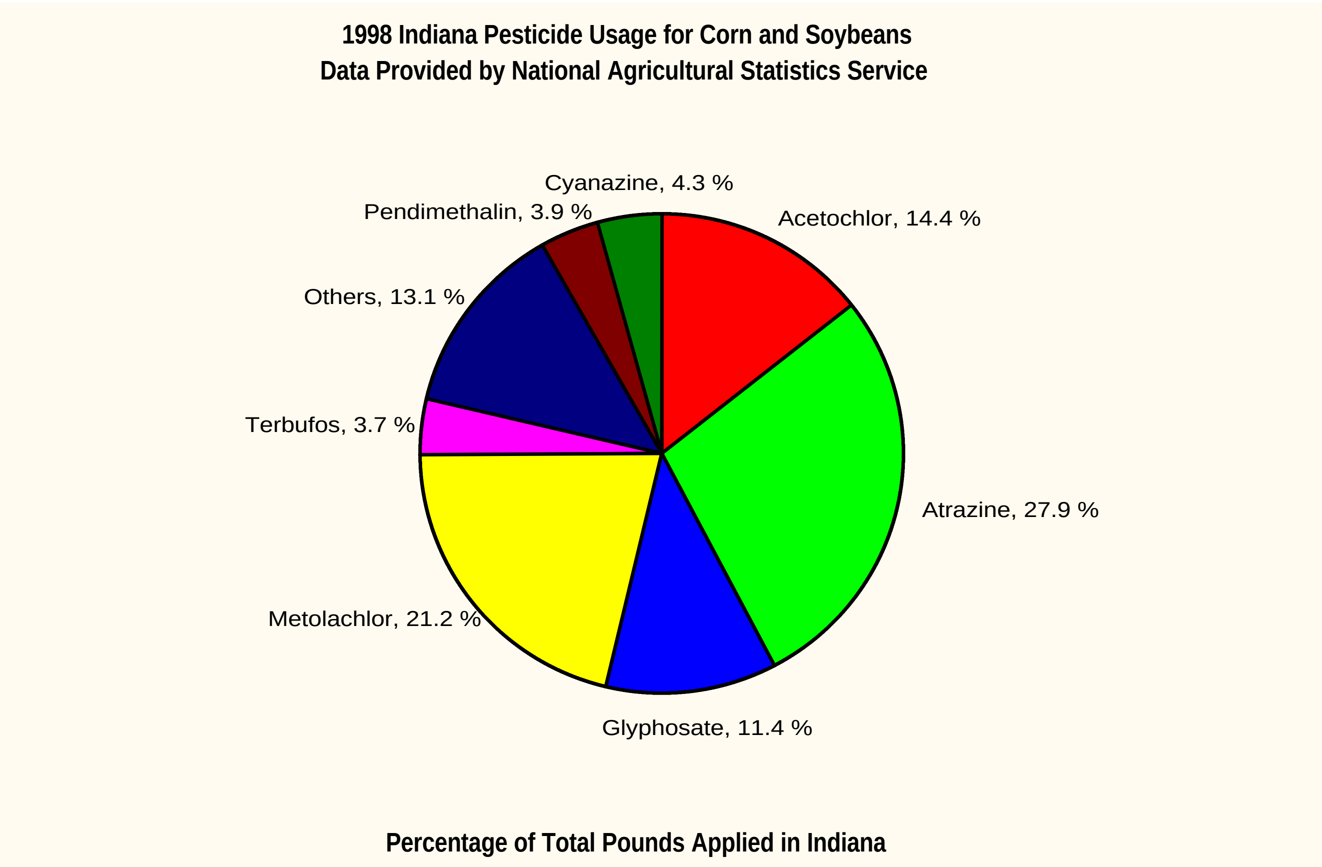

Figure 1 Percentage of Pounds of Selected Pesticides Applied to Corn and Soybeans for the State of Indiana

Further details and a limited list of their associated brand names for the ten most commonly used pesticides are discussed below.

Atrazine

Brand Name(s): AATREX, BICEP, EXTRAZINE, BULLET, LARIAT, SURPASS and GUARDSMAN

Atrazine, a triazine derivative (Carter, Lydy, and Crawford 1995), is a restricted use pesticide with a toxicity rating of III (moderately toxic). Atrazine has been produced by Novartis (formally Ciba Corporation) since 1958. It is used as a preemergent and postemergent herbicide to control broadleaf and grassy weeds for corn production. Atrazine is used to kill weeds by inhibiting the photosynthetic process in targeted plants. The soil absorption is moderate, and the biological degradation for aerobic conditions is about 146 days and 159 days for anaerobic conditions. The persistence of atrazine in the field is about 60 days, making this a very effective herbicide, but it can persist in the soil for more than a year in arid environmental conditions and high soil pH (Ahrens 1994). Atrazine was the most used pesticide in Indiana, with an estimated 7.05 million pounds applied to 89% of the 5.8 million acres of corn crops in 1998 (NASS 1999). It is considered a possible human carcinogen. It has been found to cause tumors in mammary glands and other reproductive organs in laboratory animals, and has a low-level bioaccumulation in fish. It has been categorized as possible endocrine disruption (ORSANCO 1997).

Atrazine was the most commonly detected herbicide and was found at a concentration of 36 ug/L on June 11, 1998 at Mississinewa River near Ridgeville (Table V-7 & Graph VI-7). The average concentration for the 15-week sampling season was 3.31 ug/L. The month of June then doubled the seasonal MCL with an average of 6.62 ug/L. The only two sites that never exceeded 3.0 ug/L were TR-79, and TR-159. The rest of the sites exceeded this value on at least one occasion. Over half of the sites which contain a concentration over 3.0 ug/L (15/22) had between 4-7 samples that recorded an atrazine concentration greater than or equal to 3.0 ug/L.

Metolachlor
Brand Name(s): DUAL

Metolachlor, a chloroacetamide class of herbicide (Carter, Lydy, and Crawford 1995), is a general use pesticide, and has a class III toxicity rating. It can be a restricted use pesticide when paired with atrazine or cyanazine. Ciba Corporation, now known as Novartis, first produced metolachlor in 1972. It is applied as a preemergent as well as a postemergent herbicide to control broadleaf weeds, grasses, and yellow nutsedge in corn and soybean fields for about 10-14 weeks.

Metolachlor is moderately absorbed to soil and prefers muck, clay and organic matter. The compound's photo degradation period is about 70 days. It aerobically degrades in about 67 days and anaerobically in 81 days (Ahrens 1994). Metolachlor was the second most used pesticide in Indiana (NASS 1999). There was an estimated 4.93 million pounds applied to 42% of the 5.8 million acres of corn, and an additional 0.43 million pounds applied to 4% of the 5.7 million acres of soybeans in 1998.

The peak concentration of metolachlor found in the Mississinewa River at Ridgeville (Table V-7 & Graph VI-7) with a concentration of 41 ug/L. The average concentration for the 15 week sample season was 2.17 ug/L. Metolachlor was detected in all but 8 samples out of 358 total samples. Each sampling site displayed several samples that detected metolachlor.

Acetochlor
Brand Name(s): HARNESS, GUARDIAN, and SURPASS

Acetochlor, manufactured by Monsanto and Zeneca, is a restricted use pesticide and has a toxicity class rating I (highly toxic). Acetochlor is a member of the chloroacetamide chemical family. It is used to control grasses, some broadleaf weeds, and yellow nutsedge in corn. The U.S. Environmental Protection Agency (USEPA) conditionally registered acetochlor in 1994. This was due to the broad-spectrum weed control provided by acetochlor and low labeled use rates. The USEPA expects that use of acetochlor will significantly reduce total amounts of herbicides used in the United States. The continued registration of acetochlor is conditional, based on the targeted use reductions of the herbicides alachlor, atrazine, butylate, EPTC, metolachlor, and 2,4-D. Acetochlor has chemical properties similar to alachlor and metolachlor, and has been classified by the USEPA as a probable human carcinogen.

Registration of acetochlor will be canceled automatically if there is a violation of any of the following conditions:

- reductions in the use of other broad-spectrum herbicides are not met
- measured concentrations of acetochlor in groundwater consistently exceed 0.1 micrograms per liter (ug/L) at a large number of wells or
- exceed 1.0 ug/L in groundwater at a small number of wells.

Also the annual average concentration of acetochlor cannot exceed 2.0 ug/L in the surface water supply of a specified number of community water systems (Crawford 1997).

Acetochlor is readily absorbed by soil and is degraded by microbes. Generally, acetochlor provides 8-12 weeks of preemergent weed control, but can vary depending on soil type and weather conditions (Ahrens 1994). Rainfall totals of 0.3-0.6 inches will activate acetochlor 7-10 days after application, and it is most active on heavy or high organic matter soils (Thomson 1993). Acetochlor was the third most used pesticide in Indiana during 1998 with 3.63 million pounds applied. Acetochlor was applied to 32% of the 5.80 million corn acres planted in 1998 (NASS 1999).

Based on the recent USGS report on acetochlor and statistics from NASS, the use of acetochlor over the past several years has increased. In 1997 NASS reported acetochlor was used on only 15% of 6 million corn acres of Indiana. Crawford (1997) reported peak concentrations of acetochlor in surface water to be around 3.2 ug/L. However, findings of this study revealed that peak concentrations of acetochlor were detected at 14 ug/L during the largest rain event (Table V-7 & VI-7). However monthly averages of acetochlor concentration never exceeded the MCL of 2.0 ug/L. Of the 24 sites sampled 21 had at least one week with the acetochlor concentration greater than or equal to 2.0 ug/L. There were three sites that had a third or more of their samples greater than or equal to the 2.0 ug/L. These sites were WB-387 (Table V-6 & Graph VI-6), S-30 (Table V-4 & Graph VI-4), and S-3 (Table V-5 & Graph VI-5). Site S-3 had a concentration that exceeded the MCL for the whole month of June in addition to the last week of May and the first week of July. The other two sites had four samples in a row that exceeded the MCL. These concentrations occurred during the initial rains following the planting season.

Glyphosate

Brand Name(s): SILHOUETTE, RATTLER, ROUNDUP, RODEO and TOUCHDOWN

Glyphosate is a general use pesticide and is not part of any accepted chemical family. It has a toxicity rating of II (very toxic). Glyphosate is manufactured by several companies including Monsanto, Cenex/Land O=Lakes, Helena and Zeneca. Glyphosate is usually mixed with a salt and another herbicide to create an effective product. It is used as both a preemergent and a postemergent herbicide. Glyphosate is a broad-spectrum, non-selective systemic herbicide used for control of annual and perennial plants including grasses, sedges, broad-leaved weeds, and woody plants. It rapidly absorbs to all soils, degrades microbially in soil and has a low potential for movement by runoff in field and lab studies (Ahrens 1994). About 2.68 million pounds of glyphosate were applied to 55% of the 5.70 million acres of soybean crops in 1998, and about .21 million pounds of glyphosate were applied to 6% of 5.8 million acres of corn in 1998 (NASS 1999). Glyphosate was not included among the analytes in the test method used for this study. This compound was the fourth most used herbicide in 1997 and has an MCL of 700 ug/L.

Cyanazine

Brand Name(s): BLADEX

Cyanazine is a restricted use pesticide and is part of the triazine chemical family (Carter, Lydy, and Crawford 1995) with a toxicity rating of III. Cyanazine was developed by DuPont in 1971 for use on corn to control broadleaf and grassy weeds. Cyanazine is the fifth most used herbicide in Indiana, with an estimated 1.09 million pounds applied to 13% of the 5.8 million acres of corn in Indiana in 1998 (NASS 1999). DuPont has agreed to phase out cyanazine completely in response to a special review of the herbicide by the USEPA concerning chronic cyanazine exposure and the risk of cancer, occurrence in groundwater, and its teratogenicity. The manufacturer chose to phase out cyanazine voluntarily due to the costly review process. The phase out will begin by reducing the manufacturer's recommended application rates. All sales and distribution by DuPont were banned December 31, 1999. Retailers will be permitted to sell existing stocks through September 1, 2002, with all use prohibited after December 31, 2002 (ORSANCO 1997).

Cyanazine inhibits photosynthesis of broadleaf weeds and several grasses. It can be used as a preemergent or postemergent herbicide. Cyanazine=s absorption increases when water content in soil is low and organic matter is high (Ahrens 1994). Cyanazine is part of the triazine family along with simazine and atrazine. This corn herbicide is not used nearly as much as atrazine but is still an effective herbicide. The peak concentration found for cyanazine in this project was 3.8 ug/L. An MCL for cyanazine is not available.

Pendimethalin

Brand Name(s): PROWL, PURSUIT, SQUADRON, SOUTHERN WEEDGRASS CONTROL and ORNAMENTAL HERBICIDE II

Pendimethalin, a member of the dinitroaniline chemical family (Carter, Lydy, and Crawford 1995), is a general use pesticide and is manufactured by two companies, American Cyanamid and Scotts. It has a toxicity rating of III. The intended use of the chemical is for controlling grasses and certain broadleaf weeds. It is used in both preemergent and postemergent applications. Pendimethalin can be applied in liquid fertilizer, or impregnated on dry bulk fertilizer. This compound is strongly absorbed by clay and organic matter. Degradation is rapid under anaerobic conditions and slow under aerobic conditions. Pendimethalin is immobile when strongly bound to clay and organic matter. Most pendimethalin washed into surface water via sediment will remain bound to sediment and unavailable to aquatic life (Ahrens 1994).

Approximately 1.0 million pounds of pendimethalin was applied to 19% of the 5.70 million acres of soybean plants in 1998 (NASS 1999). Pendimethalin was only detected 3 times throughout the study with a peak concentration of 0.2 ug/L. It was the sixth most used pesticide in 1998.

Terbufos

Brand Name(s): ARAGRAN, CONTRAVEN, COUNTER, and PLYDOX

Terbufos, a member of the organophosphate chemical family, is a restricted use pesticide only in products with 15% or more active ingredient. It is classified as toxicity class I, highly toxic. Terbufos is an insecticide and nematicide used on corn. It is used to control wireworms, seedcorn maggots, white grubs, corn rootworm larvae, and other pests. Terbufos is extremely toxic to birds, mammals, fish, and aquatic invertebrates. There is no known effects on the reproductive systems or teratogenic, mutagenic, or carcinogenic effects to laboratory animals. Terbufos is moderately persistent in soil. Degradation is rapid in the first 15-30 days after application. It dissipates quicker in soils with very low organic carbon. Soil temperature increases the time of degradation, and soil moisture has no effect on terbufos. It is generally immobile and is therefore unlikely to leach out of the area applied. In one study, over 90% of the applied terbufos was recovered in the top 4 inches of a soil profile despite heavy rainfall (Oregon State University 1996).

There were no samples that have a concentration of terbufos above the detection limit in 1998. It was the seventh most used pesticide in 1998

2,4-D

Brand Name(s): TILLER, NAVIGATE, CLASS, WEED-PRO 4 AMINE, JUSTICE, WARRANT, BARRAGE, and CAMPAIGN

2,4-D is a general use pesticide with a toxicity rating of III, and belongs to the chlorinated phenoxy chemical family (Carter, Lydy, and Crawford 1995). It is a foliar-applied herbicide used to control many broadleaf weeds such as pigweed, ragweed, cocklebur and others with little or no activity against grasses. It is also labeled for aquatic weed control, specifically for Eurasian water milfoil, water hyacinth, bulrush, bladderwort, and water lily. 2,4-D is exclusively used for postemergent applications. Many different companies manufacture 2,4-D. They include

AgrEvo, AGSCO, Applied Biochemists, Cenex, Cornbelt, DowElanco, Farmland, Helena, Monsanto and others.

2,4-D undergoes degradation via microbial breakdown in warm, moist soil. The rate of breakdown increases with increased temperatures and moisture. The average field half-life is 10 days. There is a potential for mobility, but rapid degradation in soil and removal from soil by plant uptake minimizes leaching (Ahrens 1994). Approximately 0.58 million pounds of 2,4-D were applied to 26% of the 5.70 million acres of soybeans, and 0.18 million pounds applied to 7% of the 5.80 million acres of corn planted in 1998 (NASS 1999). As with glyphosate, 2,4-D was not included among the analytes in the test method used for this study. 2,4-D was the seventh most used herbicide in 1997.

Chlorpyrifos

Brand Name(s): DURSBAN, LORSBAN, BRODAN, DETMOL, UA, DOWCO 179, EMPIRE, ERADEX, PAQEANT, PIRIDANE, SCOUT, and STIPEND.

Chlorpyrifos, a general use pesticide depending on the toxicity of the formulation. It belongs to the organophosphate chemical family, and has a toxicity class of II. The manufacturer of chlorpyrifos is DowAgra.

Chlorpyrifos is a broad-spectrum organophosphate insecticide. It was originally used to control mosquitoes; it is no longer registered for that use. It is an effective control for cutworms, corn rootworms, cockroaches, grubs, flea beetles, flies, termites, fire ants, and lice. It is used in agricultural, lawns and ornamental settings. It is also applied to livestock, domestic dwellings, and commercial establishments as an insecticide. It is primarily a contact poison, with some action as a stomach poison.

Chlorpyrifos was detected 107 times at or above the detection limit of 0.1 ug/L. The average of the 107 detections was 0.4 ug/L. There is no MCL set for chlorpyrifos, but the lifetime health advisory is 0.02 ug/L.

Clomazone

Brand Name(s): COMMAND and COMMENCE

Clomazone, a general use pesticide, is an unclassified chemical family (Carter, Lydy, and Crawford 1995), and has a toxicity rating of III. The manufacturer of clomazone is FMC. Clomazone is used in soybeans as a preplant or a preemergent herbicide. It targets annual broadleaf and grassy weeds. Chlorophyll is believed to be the target of clomazone. Clomazone has an average half-life of 24 days, with a half-life in silt loam soils of around 36 days. It has low mobility in most soil types, but moderate mobility in fine sand (Ahrens 1994). There is no MCL for clomazone. This was the ninth most commonly used pesticide in Indiana in 1998 using .28 million pounds on 5.7 million acres of soybeans.

RESULTS AND DISCUSSIONS

This pesticides monitoring report is based on the following assumptions.

1. All conclusions are based on a sampling frequency of a seven-day cycle.
2. Land use coverage is based on U.S. Geological Survey 1994 publication.
3. Loading calculations were made assuming concentrations and flow rates remained constant throughout the day.

GENERAL OBSERVATIONS

This report concentrates on atrazine, acetochlor, and metolachlor. These were the three most used agricultural pesticides in Indiana, and also the most commonly detected in the samples. The average concentration for the three, in respective order, are 3.31 ug/L, 1.04 ug/L, and 2.17 ug/L. There were several other pesticides found regularly during the high flow periods such as alachlor, cyanazine, and pendimethalin. Although these chemicals are important to mention, they were not found at the same frequencies as atrazine, acetochlor and metolachlor. For more detailed information on the pesticides found in this project refer to Appendices IV and V.

The main objective of this project was to detect pesticides if any, establish their respective concentrations, and calculate loading in surface waters of the Upper Wabash River Basin. Using this information and estimated herbicide application for the watershed, a percent runoff can be established. The percent runoff will vary due to many factors such as agricultural practices, soil characteristics, chemical characteristics of the pesticide, size of watershed, and the amount of time between the pesticide application and a major rainfall event. The average runoff rates for the three respective herbicides are as follows: atrazine 1.14%, acetochlor 0.49%, and metolachlor 1.20%. A study of the White River Basin by the USGS indicated a percent runoff of 1% (Carter, Lydy, and Crawford 1995). Findings of the 1998 Upper Wabash River study indicated a close relationship to the White River Basin survey. Individual watersheds do have varying results and are discussed more fully in the section titled: RUNOFF CALCULATIONS.

LOADING CALCULATIONS

To calculate loading, flow data were obtained at USGS gaging stations giving instantaneous flow velocity readings when grab samples were collected. Loading[1] was then calculated by multiplying the flow rate by the concentration of pesticide by a conversion factor for the weight of one gallon of water.[2]

[1] Loading equation, [concentration (ug/L)][flow(cfs)][conversion]=lbs/day

[2] Conversion factor equation for the weight of one gallon of water.$(28.3L/1\ ft^3)(ug/L)(ft^3/s)(3600s/1hr)(24hr/1d)(1g/10^6 ug)(.0353oz/1g)(1lb/16oz)=.0053945$

To estimate the total load contributed by runoff took further mathematical calculation. The true shape of the function describing the load per unit time is not known. Instead, the function available consists of discrete points spaced roughly one week apart, with one load observation about seven days prior to the following observation. As a result, it is not possible to integrate the true function to find the total mass of any particular chemical that ran off into the stream.

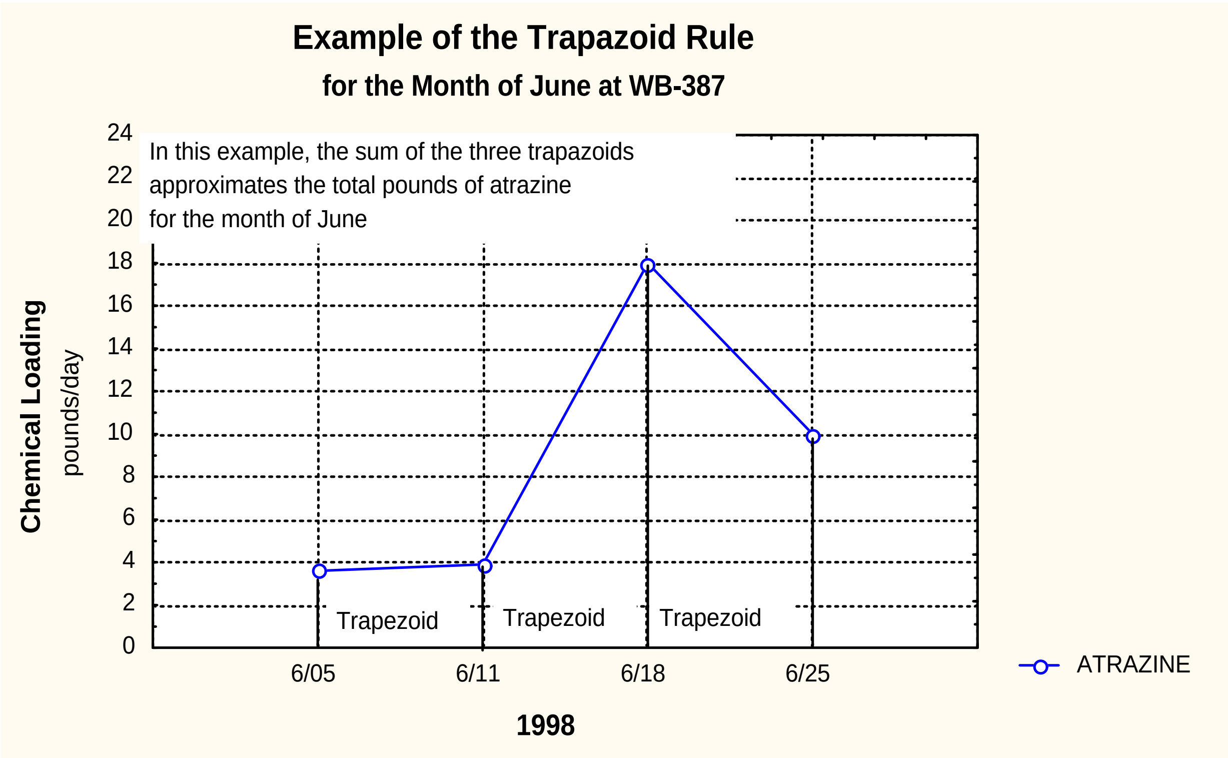

Figure 2 Example of the Trapezoid Rule

In cases like this, other methods are available to approximate the integral. One of these methods is known as the Trapezoid Rule. An example graph of this rule can be seen in Figure 2. This method calculates the area under the load function by creating *n-1* trapezoids for *n* observations where the area if each trapezoid is $(l_1 + l_2) /2 * w$. The lengths of the legs of the trapezoids are the magnitude of the successive load observations, and the widths of the trapezoids are the intervals of time. By summing all of the trapezoids, the total pounds of chemical contributed by runoff into the stream or river can be approximated for each sampling station. These calculations were used to construct Tables 5, 6, and 7. Tables 5, 6, and 7 contain only 11 of the 24 sampling sites. These 11 sites were selected because they represent the first and last sites on the main stem of the Wabash River and the sampling site closest to the confluence of all the tributaries that were sampled.

Table 5 Loading in Pounds per Day of Atrazine for Eleven Selected Sample Sites

Sample Week	WB-445	LR-8	WCS-4	WC-5	DC-5	S-3	ELL-7	TR-9	MS-7	PIP-11	WB-311
04/20/98	3.81	0	0	.46	.38	2.23	.56	4.96	4.62	.25	16.74
04/27/98	1.46	.06	.26	.06	.32	0	.76	0	.45	2.16	6.03
05/04/98	1.77	[1]	[1]	[1]	[1]	1.51	22.92	19.37	6.03	0	155.99
05/11/98	.88	.26	2.04	9.17	1.12	8.93	.79	27.10	4.82	1.23	19.60
05/18/98	.40	.47	.64	8.68	2.90	1.49	66.60	1.94	6.91	.40	22.79
05/25/98	4.43	.17	8.15	22.60	2.38	1.92	5.36	23.82	6.75	.47	5.93
06/01/98	4.64	.10	1.54	3.34	1.56	2.51	2.93	28.99	9.04	.16	84.87
06/08/98	2.06	.12	.56	1.75	.33	2.51	1.19	14.89	9.52	.11	22.08
06/12/98[2]	[3]	[3]	820.50	1355.37	249.53	[3]	[3]	[3]	[3]	[3]	2108.39
06/15/98	134.00	9.16	45.56	200.97	28.43	3.03	73.25	257.20	356.85	12.67	1148.05
06/22/98	5.06	.50	.51	28.64	2.69	78.05	6.18	64.30	1.37	.94	710.46
06/29/98	61.66	[1]	2.98	20.70	1.50	60.87	2.90	28.24	97.78	2.33	157.95
07/06/98	20.38	.66	2.23	28.12	3.10	11.24	5.75	27.24	76.01	4.58	166.20
07/13/98	1.47	.11	.31	2.43	.38	47.35	1.35	7.51	51.40	.19	85.00
07/20/98	8.39	.08	6.14	24.60	21.57	4.16	24.57	28.15	63.82	6.13	153.73
07/27/98	2.83	.34	0	0	.34	1.36	1.75	4.21	21.82	.20	21.94
Total Pounds[4]	1683	85	567	2775	510	1521	1569	4147	6094	231	20865
Estimated Runoff[5]	1.0%	< 0.1%	0.6%	1.0%	0.5%	0.7%	0.5%	0.6%	2%	0.4%	0.8%

[1] Sample lost

[2] Extra sampling event for selected stations

[3] No data collected

[4] Loading calculated by Trapezoid Integration, extra sampling event of 6/12/98 not included

[5] Expressed as percent of total amount applied in watershed from Tables 8 & 9

Table 6 Loading in Pounds of Metolachlor for Eleven Selected Sample Sites

Sample Week	WB-445	LR-8	WCS-4	WC-5	DC-5	S-3	ELL-7	TR-9	MS-7	PIP-11	WB-311
04/20/98	4.04	.29	.01	.46	.26	2.23	0	0	6.80	.44	16.74
04/27/98	8.16	.06	.44	.63	.21	1.69	0	.98	.75	2.88	6.03
05/04/98	7.28	[1]	[1]	[1]	[1]	.91	15.28	35.52	1.26	1.68	126.28
05/11/98	.50	.32	1.31	5.93	.70	5.96	1.18	18.97	1.51	.82	14.00
05/18/98	.60	.38	.78	6.75	2.60	.78	36.63	.97	.94	.71	15.95
05/25/98	1.51	.10	5.96	14.90	1.54	.81	1.22	5.95	1.86	.32	2.37
06/01/98	1.35	.06	.54	1.39	.84	.93	.84	6.90	5.19	.10	22.33
06/08/98	.95	.05	.28	.75	.20	.92	.40	3.72	2.33	.09	6.79
06/12/98 [2]	[3]	[3]	820.50	1265.01	467.87	[3]	[3]	[3]	[3]	[3]	2459.78
06/15/98	103.18	5.91	35.53	158.66	51.99	1.18	54.94	131.59	17.48	10.97	733.80
06/22/98	2.89	.35	.37	17.73	2.96	24.02	3.09	20.58	199.00	1.28	326.81
06/29/98	56.14	[1]	2.78	22.23	3.67	126.09	2.32	24.47	96.13	2.44	166.26
07/06/98	28.14	.72	2.48	30.46	10.20	19.50	7.67	32.20	32.40	11.23	232.69
07/13/98	.86	.09	.31	2.77	.58	60.88	.67	5.37	54.04	.09	117.69
07/20/98	4.70	.08	9.65	33.83	80.87	5.14	24.57	14.08	1.31	24.52	197.65
07/27/98	3.77	.34	.20	1.46	.90	1.22	1.31	3.16	25.51	.66	58.52
Total Pounds[4]	1520	62	479	2331	1180	1724	1091	2388	2923	419	15194
Estimated % Runoff[5]	1.0%	< 0.1%	0.7%	1.0%	1.5%	1.1%	0.5%	0.5%	1.3%	0.9%	0.8%

[1] Sample lost

[2] Extra sampling event for selected stations

[3] No data collected

[4] Loading calculated by Trapezoid Integration, extra sampling event of 6/12/98 not included

[5] Expressed as percent of total amount applied in watershed from Tables 8 & 9

Table 7 Loading in Pounds of Acetochlor for Eleven Selected Sample Sites

Sample Week	WB-445	LR-8	WCS-4	WC-5	DC-5	S-3	ELL-7	TR-9	MS-7	PIP-11	WB-311
04/20/98	0	0	0	.46	.38	0	0	0	0	.38	0
04/27/98	1.46	0	0	.63	.21	0	.38	0	0	1.08	0
05/04/98	.44	[1]	[1]	[1]	[1]	1.21	7.64	0	0	0	59.43
05/11/98	.25	.11	.44	5.93	.14	6.70	0	10.84	.50	.62	11.20
05/18/98	.20	.19	.20	6.75	.70	1.04	51.80	.97	.35	.12	15.95
05/25/98	1.07	.05	2.19	14.90	.49	.89	4.14	5.95	.62	.06	1.42
06/01/98	1.11	0	.18	.28	.12	1.11	2.51	5.52	2.27	.08	13.40
06/08/98	.30	.02	0	0	0	1.08	.40	1.86	.93	.02	3.40
06/12/98[2]	[3]	[3]	202.39	451.79	35.87	[3]	[3]	[3]	[3]	[3]	562.24
06/15/98	29.47	2.43	8.20	37.02	6.50	1.18	27.47	47.85	11.65	1.46	272.22
06/22/98	.58	.09	.06	2.73	.13	23.16	1.12	7.72	71.07	.11	113.67
06/29/98	12.88	[1]	.60	9.20	.33	95.66	1.16	3.77	29.71	.22	24.94
07/06/98	1.94	.11	.50	2.34	.44	15.00	2.56	7.43	7.48	.41	66.48
07/13/98	0	.02	0	0	0	33.82	0	0	10.29	0	32.69
07/20/98	0	0	0	6.15	5.39	2.20	4.91	0	.29	1.53	21.96
07/27/98	0	0	0	0	0	.50	0	2.11	4.25	0	14.63
Total Pounds[4]	336	21	98	567	113	1263	750	737	931	43	4995
Estimated Runoff[5]	0.4%	< 0.1%	0.2%	0.4%	0.2%	1.2%	0.5%	0.2%	0.6%	0.1%	0.4%

[1] Sample lost
[2] Extra sampling event for selected stations
[3] No data collected
[4] Loading calculated by Trapezoid Integration, extra sampling event of 6/12/98 not included
[5] Expressed as percent of total amount applied in watershed from Tables 8 & 9

ESTIMATED HERBICIDES USAGE ON CORN CROP

Crop information from the maps included in Appendix I were used to create Tables 8 and 9.

Table 8 shows the estimated usage of the three major herbicides on corn crops in the Upper Wabash River Basin, based on the1998 NASS report on chemical usage. The amount of pesticide applied was calculated using the approximate crop acreage in use during the study, the percent of individual herbicide applied and the rate applied per crop year. For example, the watershed upstream of Station TR-159 has an estimated 31,639 corn acres in the Tippecanoe River Basin. That acreage is then multiplied by 89%, or the percentage of corn acres applied with atrazine as reported by the NASS (1999). The result is then multiplied by the 1.36 pounds per acre applied that equals the estimated 38,296 pounds of atrazine in the watershed upstream of Station TR-159. The rest of the chemicals were applied at different rates and percentages. Atrazine was the most prolific chemical used by Indiana corn producers while metolachlor was second and acetochlor was third. Metolachlor was also used on soybean crops so a combined total applied between the two crops has been determined and reported in Table 8.

Table 8 Estimated Herbicide Usage on Corn Crops per Crop Year

Site	Area in sq./mi.[1]	Acres Planted to Corn[2]	Pounds of Atrazine applied[3]	Pounds of Acetochlor applied[4]	Pounds of Metolachlor applied[5]	Pounds of Metolachlor applied to bean and corn crops[6]
TR-159	116	31,639	38,296	19,945	27,108	29,715
TR-79	856	243,577	294,826	153,551	208,697	228,768
TR-9	1,869	538,005	651,201	339,158	460,963	505,295
DC-5	274	85,407	103,377	53,841	73,177	80,215
WB-311	7,278	2,142,524	2,593,311	1,350,647	1,835,715	2,012,259
WB-354	3,792	1,123,149	1,359,460	708,033	962,314	1,054861
WB-370	2,700	799,328	967,507	503,896	684,864	750,711
WB-387	1,772	529,287	640,649	333,663	453,493	497,106
WB-409	725	219,559	265,754	138,410	188,118	206,210
WB-445	457	138,287	167,383	87,176	118,484	149,682
LR-8	263	77,882	94,268	49,097	66,729	84,299
ELL-53	384	114,670	138,797	72,288	98,249	124,119
ELL-7	789	236,404	286,143	149,029	202,551	222,031
S-30	425	131,153	158,748	82,679	112,372	123,179
S-3	557	168,841	204,365	106,437	144,663	158,575
MS-100	143	44,829	54,261	28,260	38,409	42,103
MS-36	691	207,410	251,049	130,751	177,709	194,800
MS-7	818	241,744	292,607	152,395	207,126	227,046
PIP-11	159	49,688	60,142	31,323	42,573	46,667
WC-80	146	46,376	56,134	29,235	39,735	43,556
WC-60	242	72,075	87,240	45,436	61,754	65575
WC-15	396	117,161	141,812	73,858	100,384	110,038
WCS-4	243	74,459	90,125	46,939	63,796	69,907
WC-5	794	238,362	288,581	150,263	204,229	223,870

[1] values reported from Table 1
[2] estimated acreage for basin above station derived from NASS (1999)
[3] amount of corn acreage receiving atrazine (89%) multiplied by 1.36 lbs. atrazine applied per acre
[4] amount of corn acreage receiving acetochlor (32%) multiplied by 1.97 lbs. acetochlor applied per acre
[5] amount of corn acreage receiving metolachlor (42%) multiplied by 2.04 lbs. metolachlor applied per acre
[6] total metolachlor applied by combining corn and bean application amounts from Tables 8 and 9

ESTIMATED PESTICIDE USAGE ON SOYBEAN CROPS

The estimated herbicide usage on soybean crops is shown in Table 9. This table contains different chemicals than Table 8 because soybeans require different pesticides than corn. According to the data, glyphosate was the most desirable of the four preferred herbicides. Pendimethalin was the second most commonly used herbicide, followed by metolachlor and 2,4-D.

Table 9 Estimated Herbicide Usage on Soybean Crops per Crop Year

Site	Drainage Area in Basin sq. mi.[1]	Acres Planted to Soybeans[2]	Pounds of Glyphosate applied[3]	Pounds of Pendimethalin applied[4]	Pounds of Metolachlor applied[5]	Pounds of 2,4-D applied[6]
TR-159	116	31,639	14,791	5,350	2,607	3,208
TR-79	856	243,577	113,872	41,189	20,071	24,699
TR-9	1,869	538,005	251,517	90,977	44,332	54,554
DC-5	274	85,407	39,928	14,442	7,038	8,660
WB-311	7,278	2,142,524	1,001,630	362,301	176,544	217,252
WB-354	3,792	1,123,149	525,072	189,924	92,547	113,887
WB-370	2,700	799,328	373,686	135,166	65,865	81,052
WB-387	1772	529,287	247,441	89,502	43,613	53,670
WB-409	725	219,559	102,644	37,127	18,092	22,263
WB-445	457	138,287	64,649	23,384	11,395	14,022
LR-8	263	77,882	36,410	13,170	6,417	7,897
ELL-53	384	114,670	53,608	19,391	9,449	11,628
ELL-7	789	236,404	110,519	39,976	19,480	23,971
S-30	425	131,153	61,314	22,178	10,807	13,299
S-3	557	168,841	78,933	28,551	13,912	17,120
MS-100	143	44,829	20,958	7,581	3,694	4,546
MS-36	691	207,410	96,964	35,073	17,091	21,031
MS-7	818	241,744	113,015	40,879	19,920	24,513
PIP-11	159	49,688	23,229	8,402	4,094	5,038
WC-80	146	46,376	21,681	7,842	3,821	4,703
WC-60	242	72,075	33,695	12,188	5,939	7,308
WC-15	396	117,161	54,773	19,812	9,654	11,880
WCS-4	243	74,161	34,670	12,627	6,111	7,520
WC-5	794	238,362	111,434	40,307	19,641	24,170

[1] values reported from Table 1
[2] estimated acreage for basin above station derived from NASS (1999)
[3] amount of soybean acreage receiving glyphosate (55%) multiplied by .85 lbs. glyphosate applied per acre
[4] amount of soybean acreage receiving pendimethalin (19%) multiplied by .89 lbs. pendimethalin applied per acre
[5] amount of soybean acreage receiving metolachlor (4%) multiplied by 2.06 lbs. metolachlor applied per acre
[6] amount of soybean acreage receiving 2,4-D (26%) multiplied by .39 lbs. 2,4-D applied per acre

RUNOFF CALCULATIONS

The importance of noting the percent runoff is to become aware of the watersheds that seem to be at a higher risk of pesticide entering into surface water. There are many factors that can cause a significant change in the amount of runoff within a watershed. These factors can be attributed to soil formation, agricultural practices, rainfall events and frequency of the events, and watershed land uses. One factor that can be noted in this study is rainfall correlated with sampling time. As noted earlier, the study design called for sampling on a weekly basis with only one sample per site. On one occasion an extra sample was taken following a severe rain event on June 12, 1998.

The entire Wildcat Creek watershed was sampled during this extra sampling event. This provided the opportunity to observe what changes, if any, occurred directly following a major rainfall event. The results indicate that huge amounts of herbicides are present following a rainstorm. In fact, by looking at the percent runoff of atrazine at site WC-80, Wildcat Creek at Jerome, the normal sampling scheduled displayed a percent runoff of nearly 3%. The extra sample tripled the runoff for the season, with a percent runoff of over 9%. Viewing the actual loading pounds can aid in making another comparison. The total loading for the entire normal sampling season for atrazine was 1,639 pounds, the extra sample on 6/12/98 indicated nearly 4,000 pounds of atrazine flowed past that one site on that one particular day. Table 10 displays the contribution of land area and percent runoff of the three main herbicides focused on in this study.

Table 10 Percentage of contributing tributaries to the Upper Wabash River Basin

Water Shed Name	Station Representing Watershed	% of contributing land area	% contribution to total lbs. of atrazine	% contribution to total lbs. of acetochlor	% contribution to total lbs. of metolachlor
Tippecanoe R	**TR-9**	25.7	19.9	14.9	17.0
Mississinewa R	**MS-7**	11.2	29.2	18.8	20.8
Wildcat Creek	**WC-5**	10.9	13.3	11.5	16.6
Eel River	**ELL-7**	10.8	7.5	15.2	7.7
Salamonie R	**S-3**	7.7	7.3	25.5	12.2
Deer Creek	**DC-5**	3.8	2.4	2.3	8.4
Little River	**LR-8**	3.6	0.4	0.4	0.1
Pipe Creek	**PIP-11**	2.2	1.1	0.9	0.4
Summary Statistics for Upper Wabash River Basin					
	WB-311	7,278 mi^2	29,607 total lbs. atrazine	4,945 total lbs. acetochlor	14,082 total lbs. metolachlor

The significance of Table 10 is to display the ratio of runoff compared to the land area of the specific watershed. Theoretically the percent chemical load contribution of a specific watershed to the Wabash River should be identical to the percent of land area of the same watershed. This would be a correct assumption only if each of the watersheds had identical traits such as soil composition, rainfall totals, sampling events related to rainfall, and land use. All of these physical traits do effect the runoff rates. By comparing the numbers in Table 10, contributions of chemical loads to the Wabash River resemble the percent land area to a certain extent. Two contrasting tributaries are the Tippecanoe River and the Mississinewa River. The lack of contribution of loading in the Tippecanoe River can be attributed, in part, to the fact that its watershed incorporates several natural lakes and reservoirs. Another factor in the lack of contribution is the amount of agricultural crop land and pasture area. The Tippecanoe River Basin has the smallest percentage of agricultural land in the Upper Wabash River Basin at 90%.

The impact on the Mississinewa River may also be attributed to other factors. A likely circumstance is that sampling was conducted following a major localized rain event causing that watershed to contribute more of a load to the Wabash River.

The regions of Indiana that contain the Upper Wabash River Basin experienced large amounts of rain during the entire summer. The overall 1998 rainfall total was 5.1 inches above the normal, 30-year average. In the sampling months of April - July the rainfall totals were 6.87 inches above the normal. The month of June was 3.76 inches above the normal total. Table 11 shows some rainfall data in the study area for this period (Scheeringa 1999).

Table 11 Rainfall Data for Each Sampling Site

Pesticide related site	City	County	Total rain fall for week of 5/31/98	Total rain fall for week of 6/7/98	Total rain fall for week of 6/14/98
TR-159	Oswego	Kosciusko	0.12	2.77	1.38
TR-79	Ora	Pulaski	0.1	1.77	1.71
TR-9	Delphi	Carroll	0.15	3.82	1.37
DC-5	Delphi	Carroll	0.15	3.82	1.37
WB-311	Lafayette	Tippecanoe	.39	4.32	2.42
WB-354	Logansport	Cass	0.19	2.59	2.11
WB-370	Peru	Miami	0.12	2.71	2.92
WB-387	Wabash	Wabash	0.18	2.15	2.63
WB-409	Huntington	Huntington	0.17	3.73	2.67
WB-445	Linn Grove	Adams	0.25	2.90	.87
LR-8	Huntington	Huntington	0.17	3.73	2.67
ELL-53	North Manchester	Wabash	0.2	1.28	1.7
ELL-7	Logansport	Cass	0.18	2.59	2.11
S-30	Warren	Huntington	0.17	3.73	2.67
S-3	Dora	Wabash	0.18	2.15	2.63
MS-100	Ridgeville	Randolph	1.96	3.23	1.63
MS-36	Marion	Grant	0.91	3.79	0.89
MS-7	Peoria	Miami	0.12	2.71	2.92
PIP-11	Bunker Hill	Miami	0.12	2.71	2.92
WC-80	Jerome	Howard	0.25	5.52	2.66
WC-60	Kokomo	Howard	0.25	5.52	2.66
WC-15	Owasco	Carroll	.15	3.82	1.37
WCS-4	Lafayette	Tippecanoe	0.39	4.32	2.42
WC-5	Lafayette	Tippecanoe	0.39	4.32	2.42

TREND ANALYSIS

By evaluating the pesticides data, as displayed in Appendix VI, Graphs VI-1 through VI-24, recognizable trends begin to develop. The combination of weather patterns, farming practices, watershed characteristics, and the chemical properties of the herbicides determine their fate during late spring and early summer. It is clearly apparent that pesticide loading in the surface waters is dependent on wet weather events coupled with seasonal patterns of farming techniques.

The bulk of the pesticides detected in this investigation are agricultural herbicides. These herbicides are primarily applied from preplant through the early part of the postemergent phase of a cropped field. The application of agricultural pesticides usually precedes or coincides with the heaviest seasonal rainfall totals for Indiana. The herbicides found with the most concentration in surface waters are primarily water-soluble. This physical property allows these pesticides to be more mobile increasing the amount of herbicides in the run off. The less water soluble a pesticide is the more affinity the chemical has to organic matter or soil particles, and the less likely the pesticide will run off into the surface waters.

By observing herbicide concentrations plotted against time, a trend of two distinct peaks is noticed on a majority of the graphs (Appendix VI). The first peak can be attributed to the application of the chemicals. Typically this peak is observed to begin in late April and attains its highest point near mid-May. A peak during this time frame can be due to exceptionally high amounts of chemicals available for runoff combined with small rainfall events, and atmospheric deposition resulting from drift after chemical application. This peak is normally followed by a one to three week plateau or decline in the concentration values, then a drastic increase of the concentration. It can be noted the bulk of the application ended at this time so there is not as much deposition from the atmosphere. The increase in concentration can be related to the increase of rainfall events. The trend after this high point was downward in concentration values. This occurs because the effort of applying pesticides is reduced after the plants have grown to a certain size, and any additional applications occurring during this stage is applied to plants that have all ready sprouted. Applying herbicides to land with growing plants decreases runoff of chemicals.

Graphs VI-5 and VI-7 display a similar pattern to the average trend discussed above with the following distinction. The rise in concentration is a little more gradual and the duration of the plateau is considerably longer. In addition, the final peak is generally about a week behind all the other corresponding locations. The two sites are located behind the dams at Salamonie and Mississinewa Reservoirs. This trait can be attributed to the effect of the dam that functions in controlling downstream flow. Both reservoirs are used for flood control. These dams have regulated flow from the reservoir, when there is a series of wet weather events or a major wet weather event sufficient to cause flooding the dam retains enough water to control flooding downstream. After waters begin to recede downstream the regulated flow is increased to let more water out of the reservoir. This type of flow regulation explains the delay in the increased concentration levels.

One graph does not conform to this generalization, Tippecanoe at Oswego, Site TR-159 (Graph VI-16). The concentrations related to this site show no trends related to any other site in the study. Likewise the watershed surroundings are not related to any other watershed in any other way. The Tippecanoe River originates and incorporates several of the natural lakes of Northern Indiana. This characteristic provides a sink for the chemicals that flow from upstream sources. This type of lake system tends to dilute the concentrations and, because of the turnover rate of the lake, the chemicals are discharged over a longer period of time.

Other variables associated with the amount of individual chemicals detected in the surface water depend on the amount of use of a chemical in the watershed and the half-life of the chemical.

Clearly a chemical with limited use will display limited concentrations within the watershed. A chemical with a longer half-life will be more persistent in the water. An example can be seen comparing atrazine and acetochlor. Atrazine has a half-life of about 60 days where acetochlor has a half-life of only about 10 days. This has an obvious impact on the detection of a chemical in surface waters over time.

DRINKING WATER CONCERNS

Table 12 contains a list of three Public Water Supply Facilities that have their drinking water intake points in the Upper Wabash River Basin. Based on animal toxicity studies, it is safe to conclude that exposure to these pesticides over a long period of time can cause cancer or non-cancer health effects in humans. IDEM's Office of Drinking Water has recently started a "Source Water Protection Program" for human health and safety. It is proposed that to comply with the IDEM's Source Water Protection Program, concerned Public Water Suppliers in the Wabash River Basin take appropriate measures to reduce human exposure to these pesticides in drinking water.

Table 12 Public Water Supply Facilities Using Surface Water From the Upper Wabash River Basin

Facility Name	City	Intake location	Public Water Supply ID
United Water Indiana-Warsaw	Warsaw	Center Lake	5243030
Logansport Municipal Utility-Water	Logansport	Eel River	5209006
Indiana American Water-Kokomo	Komoko	Wildcat Creek	5234007

RECOMMENDATIONS AND CONCLUSIONS

1. Future pesticides monitoring is the only way to understand the effects of runoff from pesticides in surface water. Trends in pesticide use within these basins should be monitored in order to identify emerging water quality issues. Attention should be given to new pesticides coming into the market.

2. It was very important to identify which tributaries contributed the greatest pesticides loads to individual watersheds. This information should be used for Non-point Source Best Management Practices. Priority should be given to federally funded Clean Water Act Section 319 grant projects within these basins to help alleviate the runoff potential.

3. Future studies of this nature should be completed in Indiana so that pesticide occurrence, concentrations, and loading can be understood for major tributaries throughout the state.

4. A study of retention time for pesticides in reservoirs and lakes should be undertaken, as should potential impact on designated uses.

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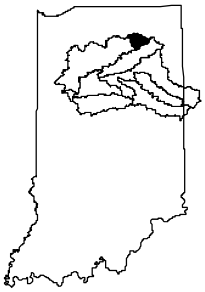
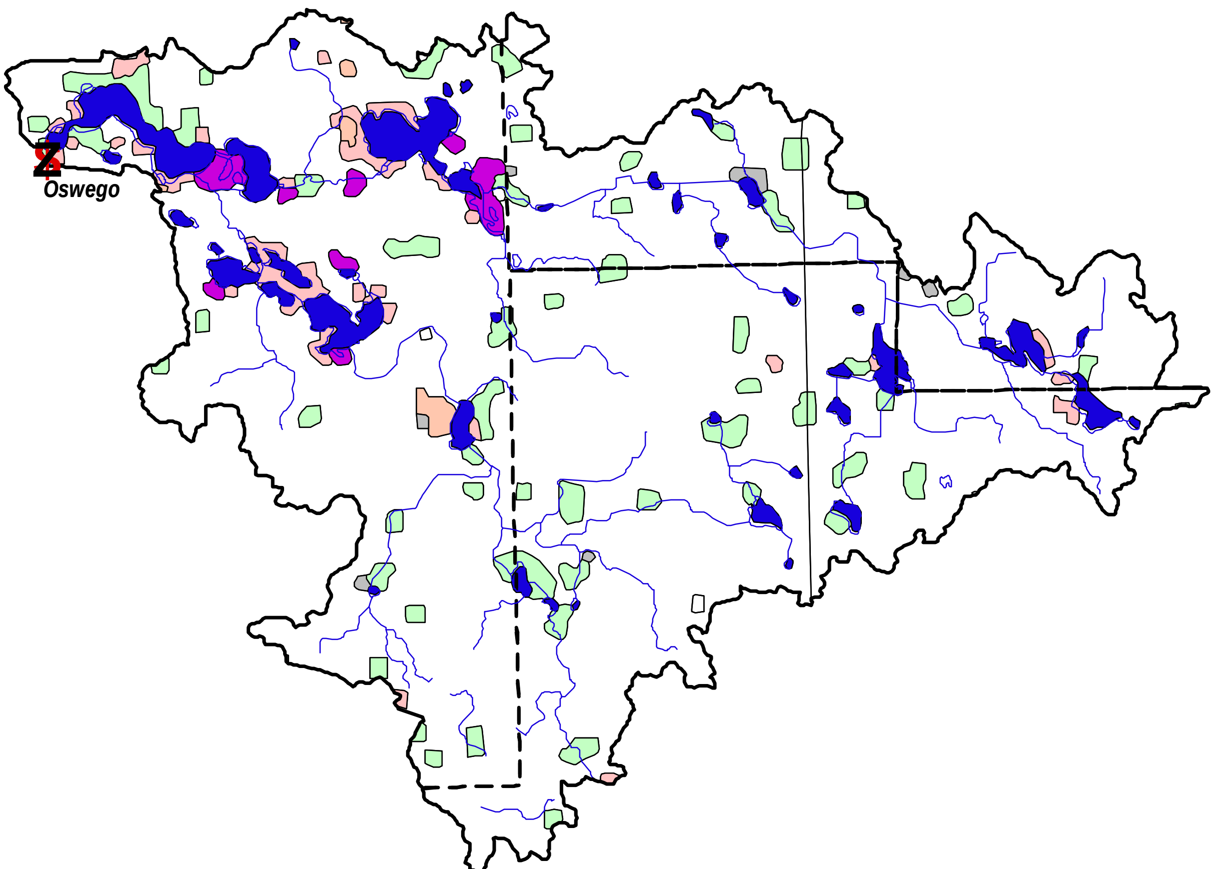
APPENDIX I

Maps and Sampling Locations
Upper Wabash River Basin



Map 1- Tippecanoe River at Oswego

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



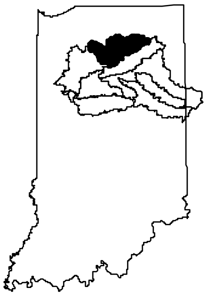
Legend

- Sampling Site TR-159
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 63,277 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Wetlands
- Other Land

N

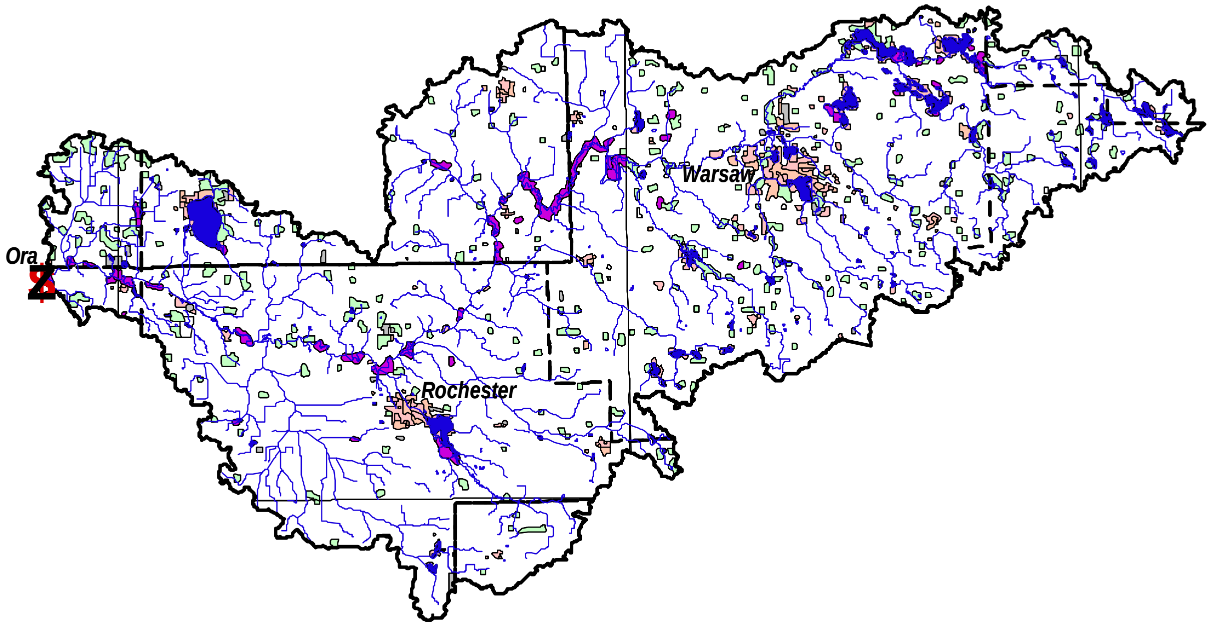
1 0 1 2 3 4 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 2- Tippecanoe River near Ora

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

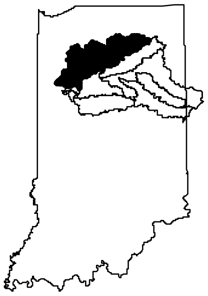
- Sampling Site TR-79
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 487,154 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Wetlands
- Other Land

N

4 0 4 8 12 Miles

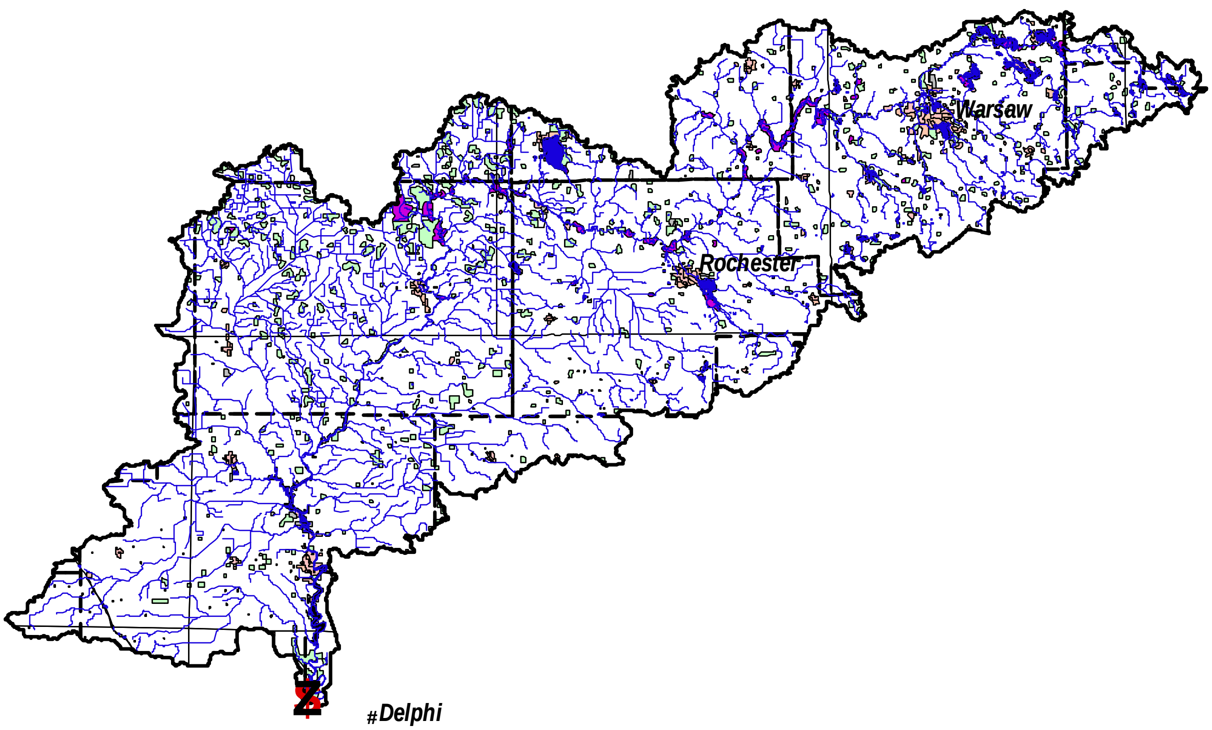
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 3- Tippecanoe River near Delphi

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



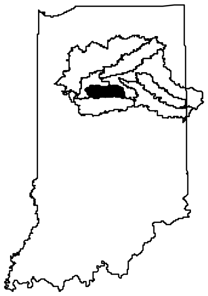
Legend

- Sampling Site TR-9
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 1,076,009 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Wetlands
- Other Land

N

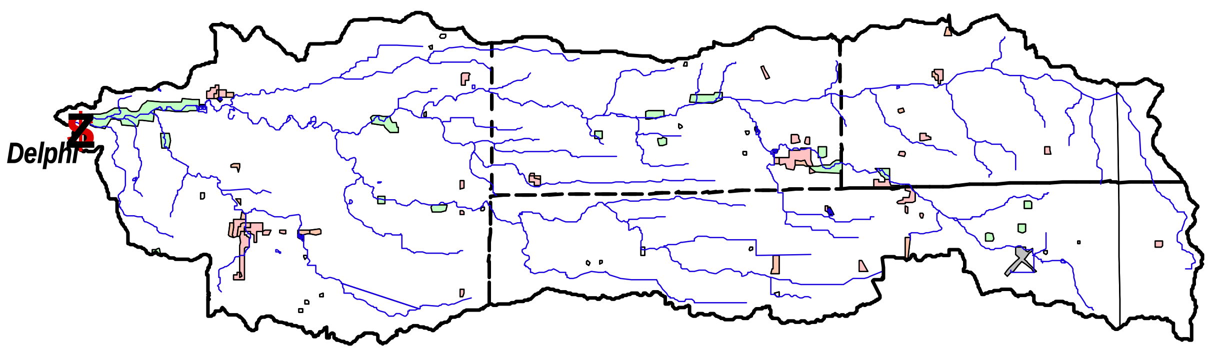
4 0 4 8 12 16 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



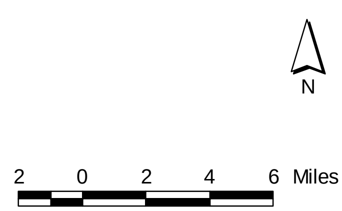
Map 4- Deer Creek near Delphi

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

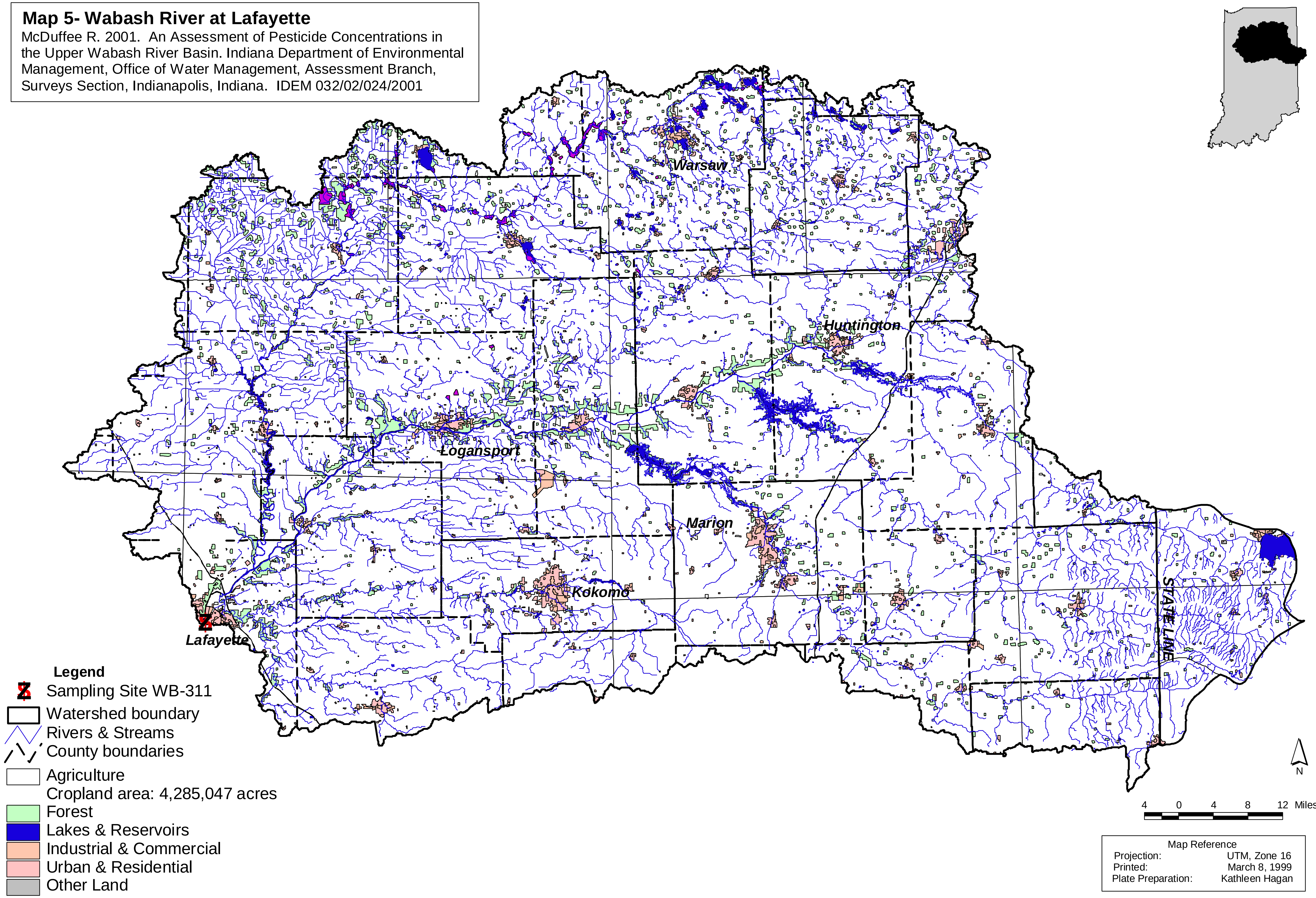
- Sampling Site DC-5
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 170,814 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

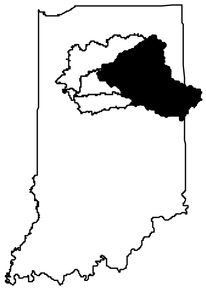


Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan

Map 5- Wabash River at Lafayette

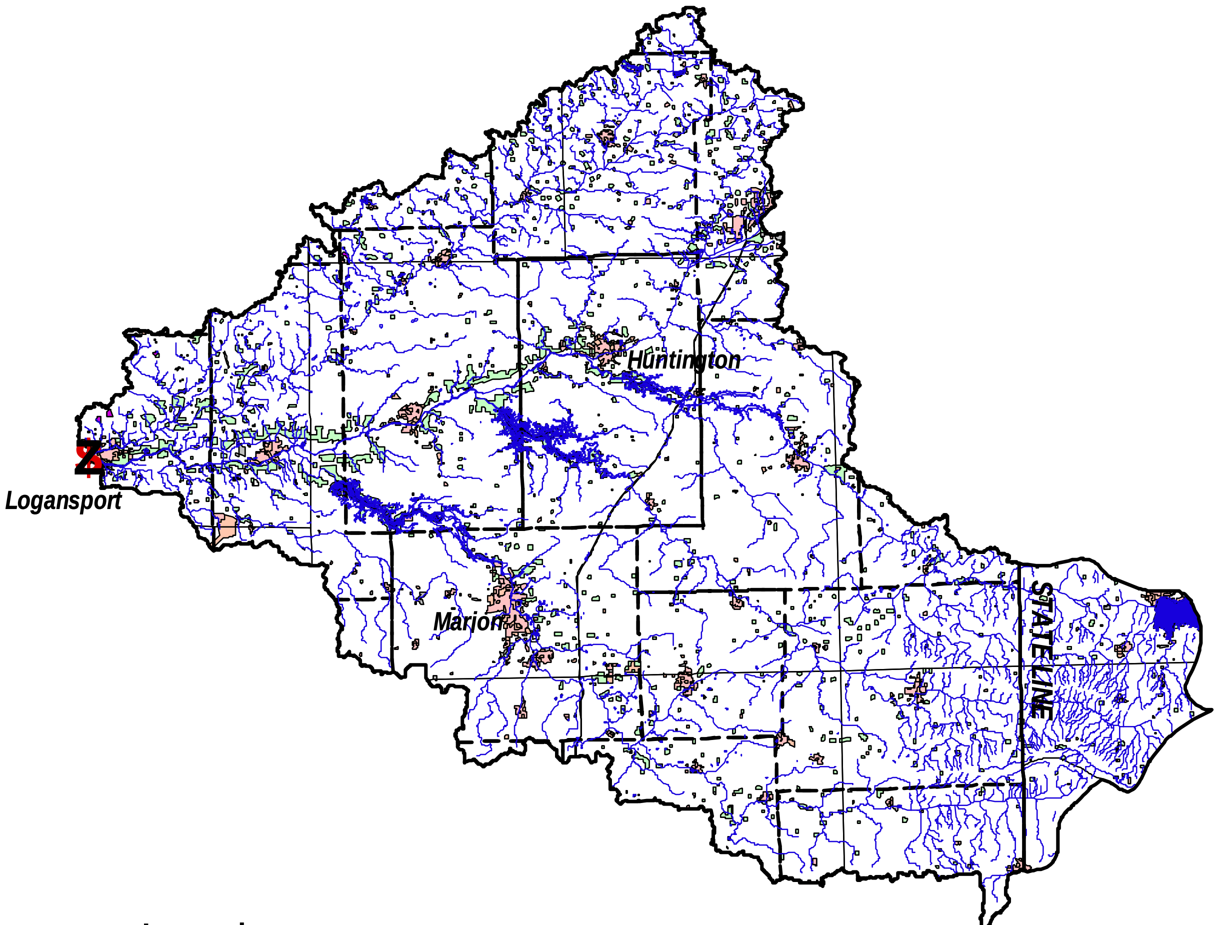
McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001





Map 6- Wabash River at Logansport

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



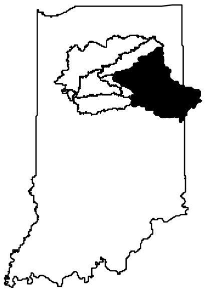
Legend

- Sampling Site WB-354
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 2,246,298 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Wetlands
- Other Land

N

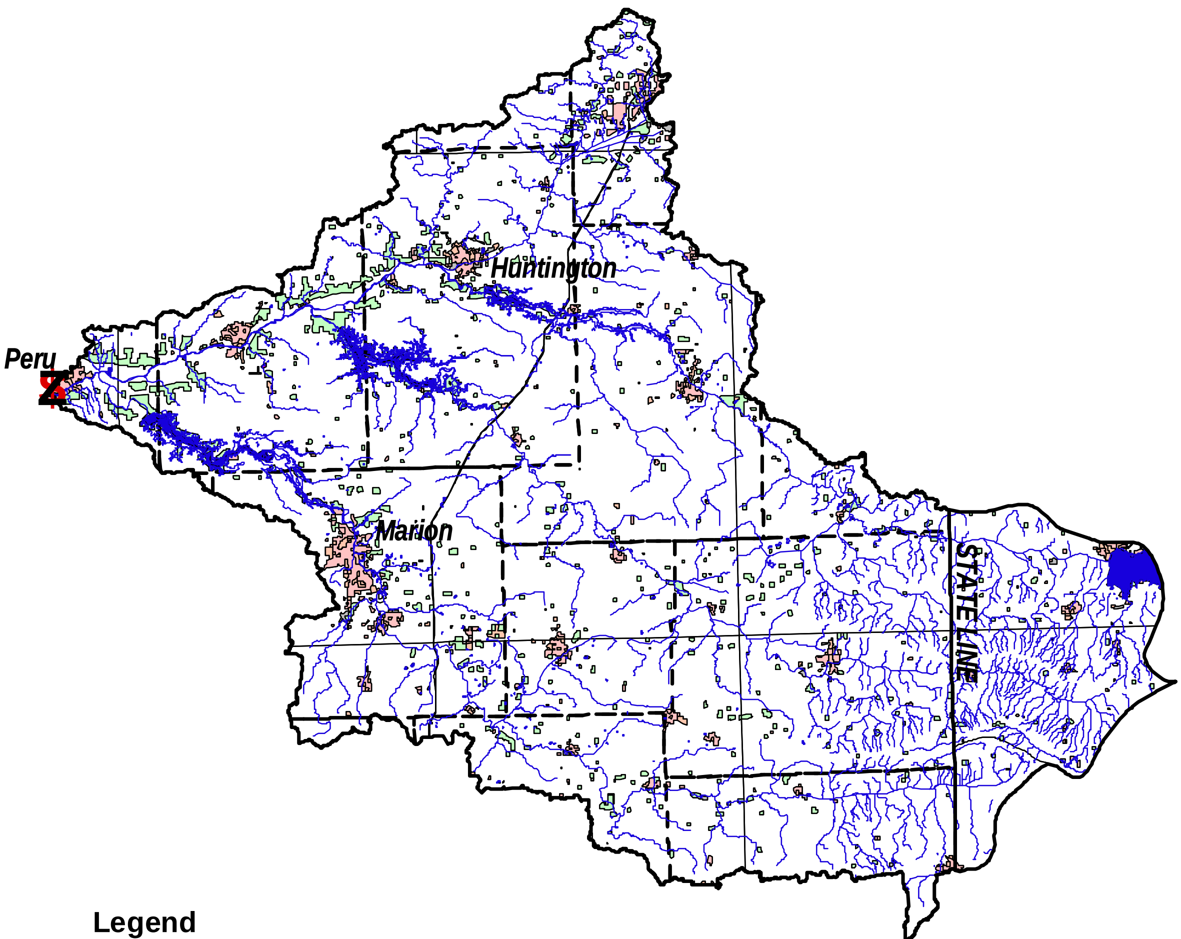
4 0 4 8 12 16 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 7- Wabash River at Peru

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



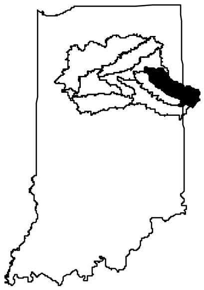
Legend

Sampling Site WB-370
Watershed boundary
Rivers & Streams
County boundaries
Agriculture
Cropland Area: 1,598,657 acres
Forest
Lakes & Reservoirs
Industrial & Commercial
Urban & Residential
Wetlands
Other Land

N

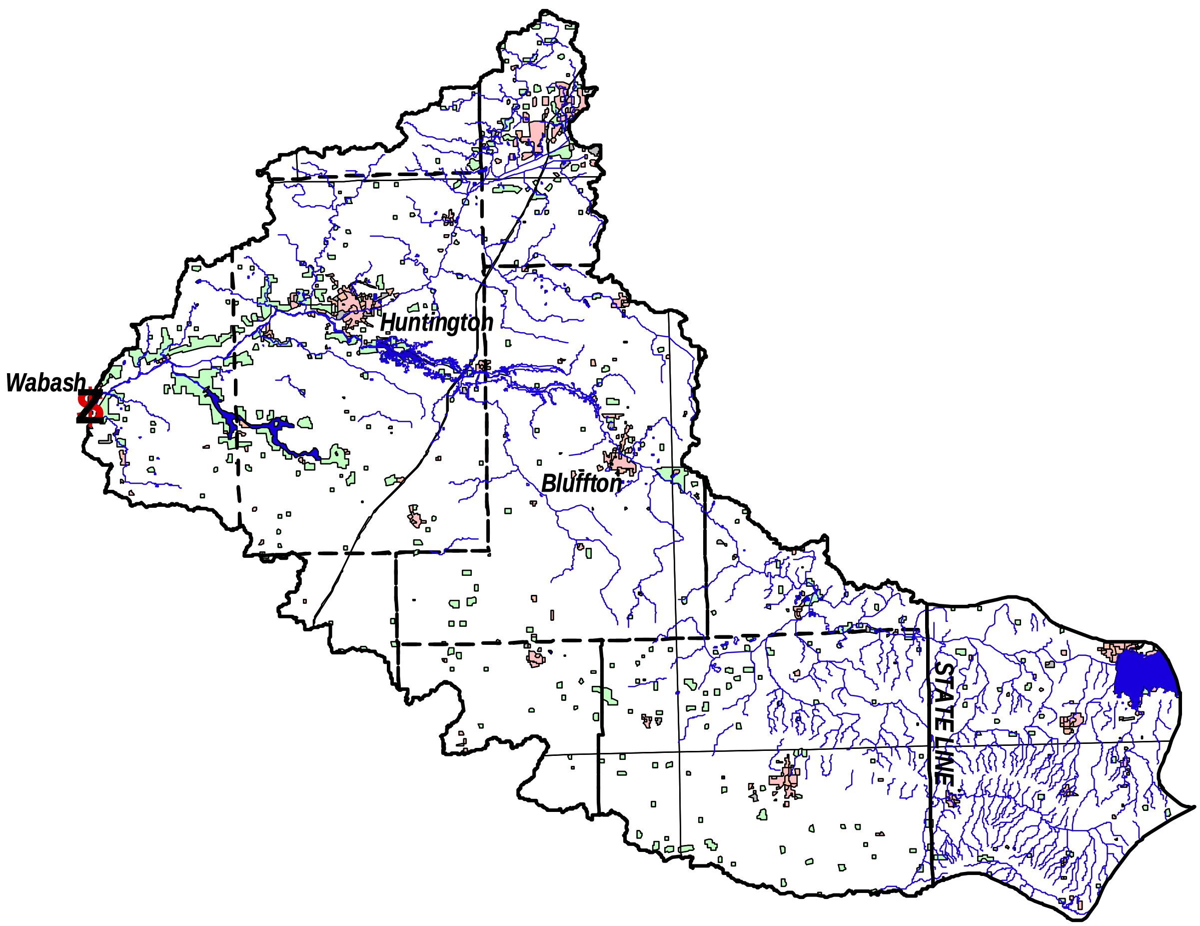
4 0 4 8 12 16 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



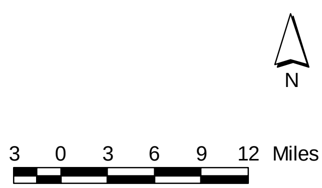
Map 8- Wabash River at Wabash

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001

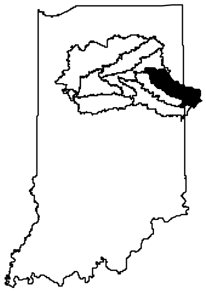


Legend

- Sampling Site WB-387
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 1,058,573 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Wetlands
- Other Land

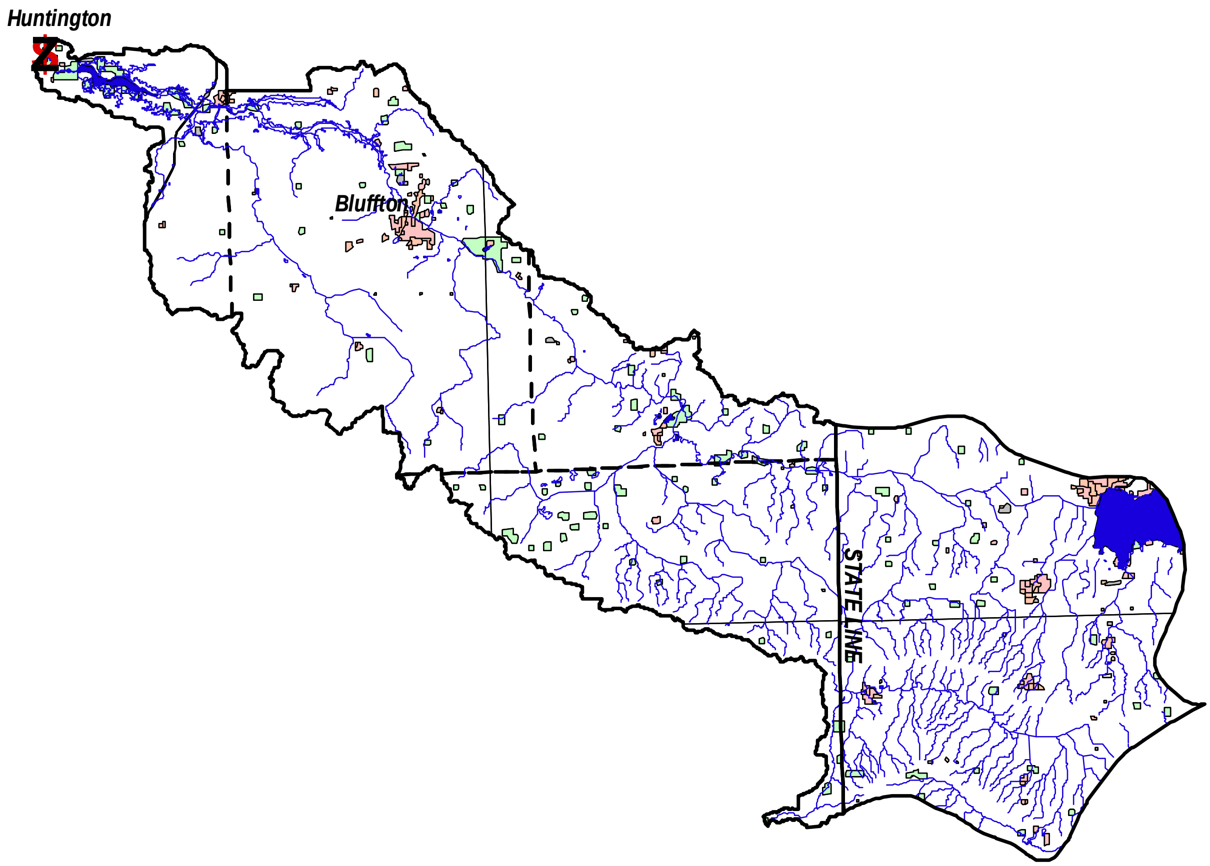


Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 9- Wabash River at Huntington

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

Sampling Site WB-409

Watershed boundary

Rivers & Streams

County boundaries

Agriculture

Cropland area: 439,118 acres

Forest

Lakes & Reservoirs

Industrial & Commercial

Urban & Residential

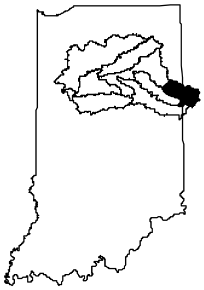
Other Land

N

2 0 2 4 6 8 10 Miles

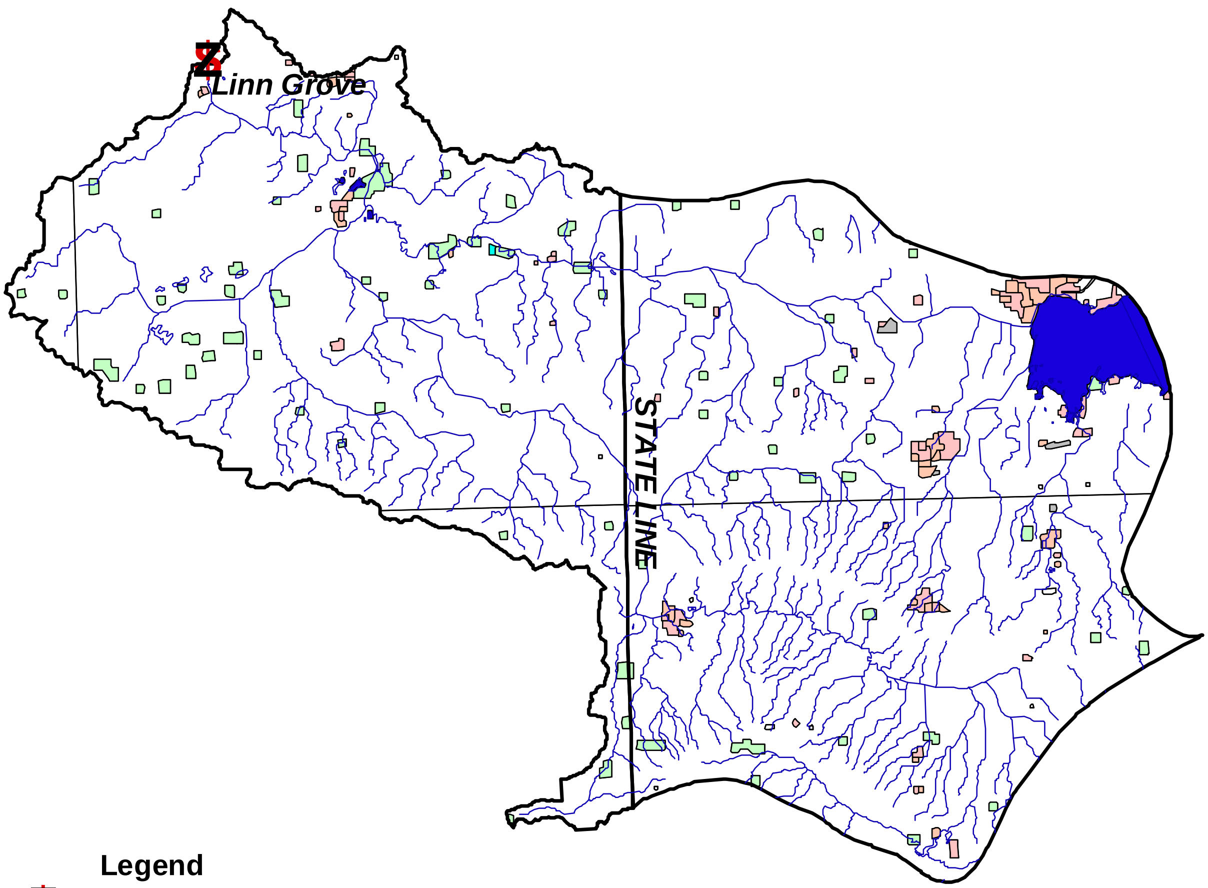
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 10- Wabash River at Linn Grove

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



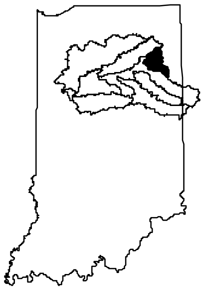
Legend

- Sampling Site WB-445
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland area: 276,575 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

N

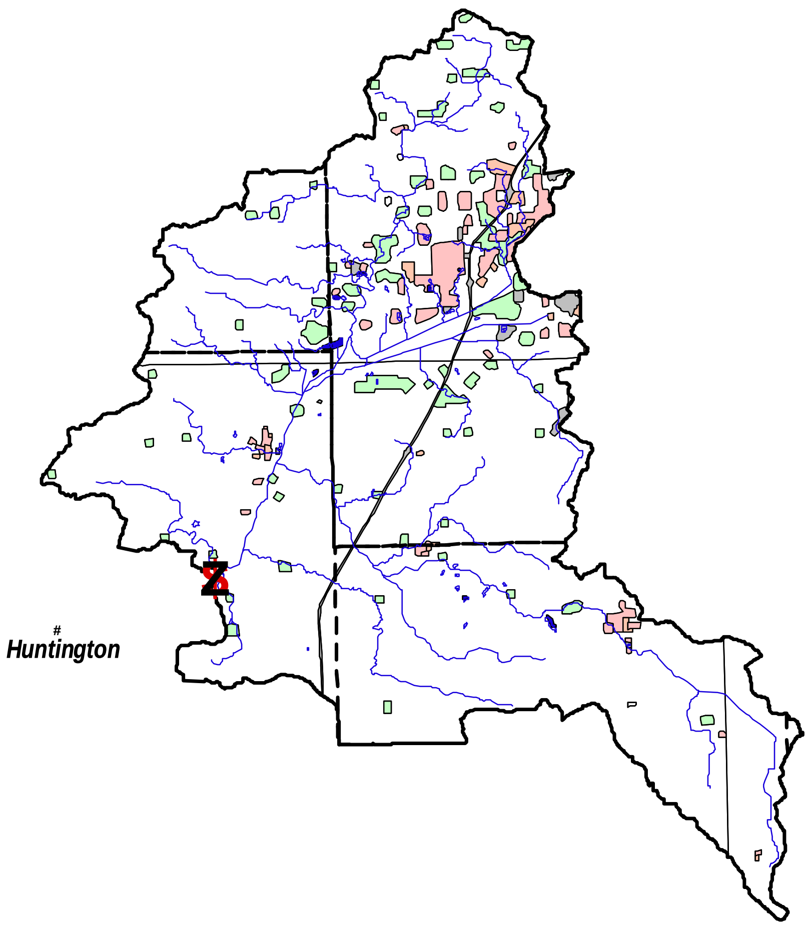
2 0 2 4 6 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 11- Little River near Huntington

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

Sampling Site LR-8

Watershed boundary

Rivers & Streams

County boundaries

Agriculture

Cropland Area: 155,763 acres

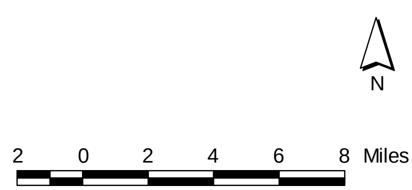
Forest

Lakes & Reservoirs

Industrial & Commercial

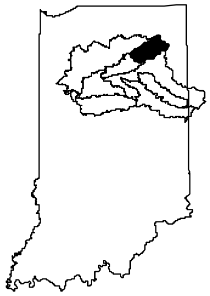
Urban & Residential

Other Land



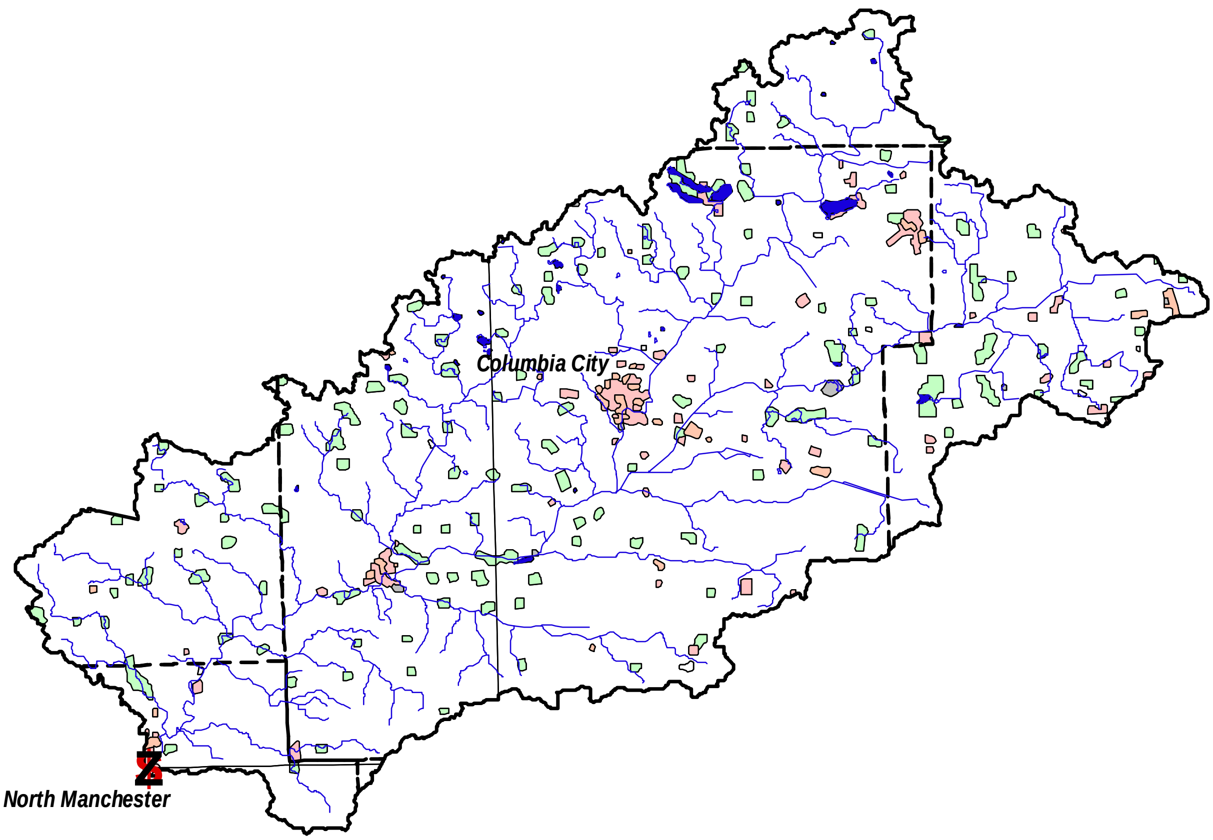
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 12- Eel River at North Manchester

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

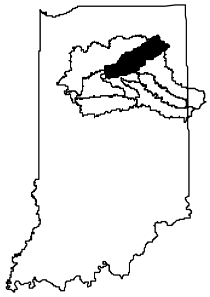
- Sampling Site ELL-53
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
- Cropland Area: 229,339 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

N

2 0 2 4 6 Miles

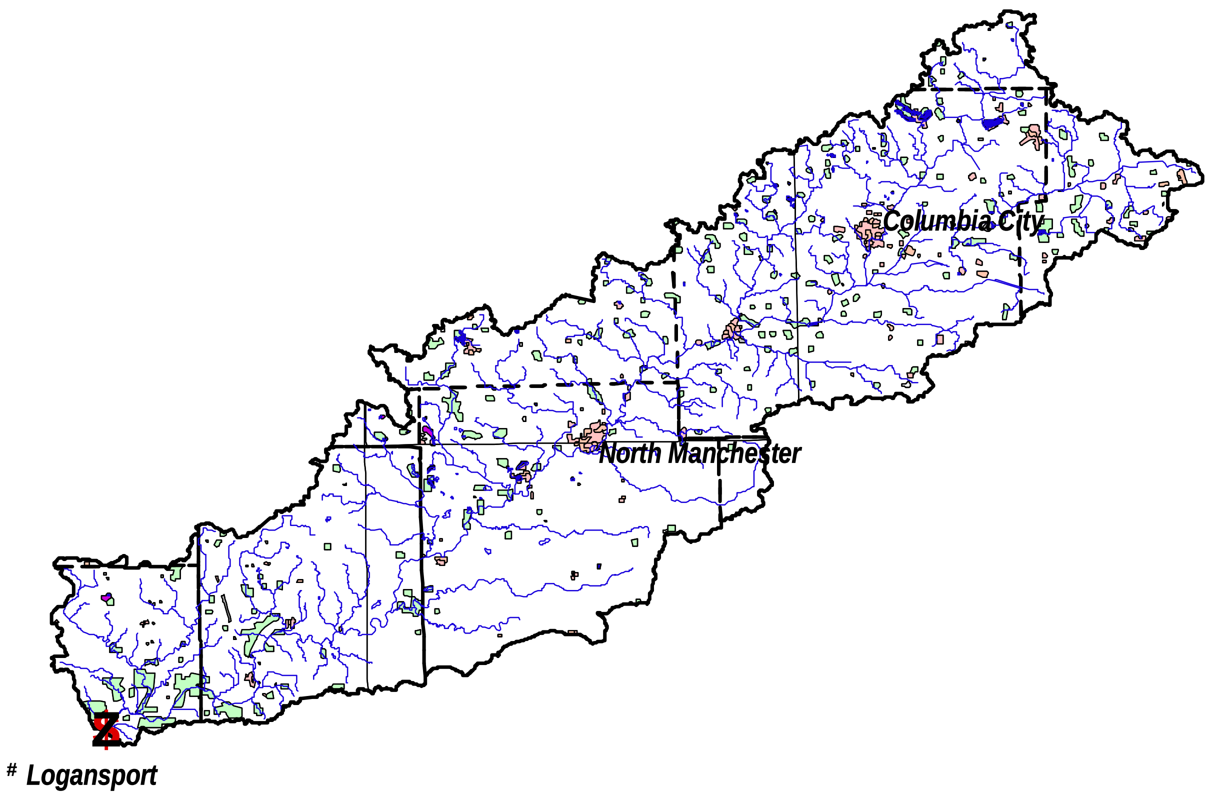
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



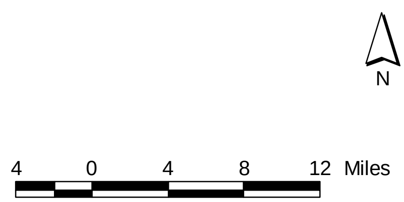
Map 13- Eel River near Logansport

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001

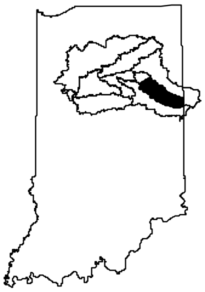


Legend

- Sampling Site ELL-7
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 472,808 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Wetlands
- Other Land

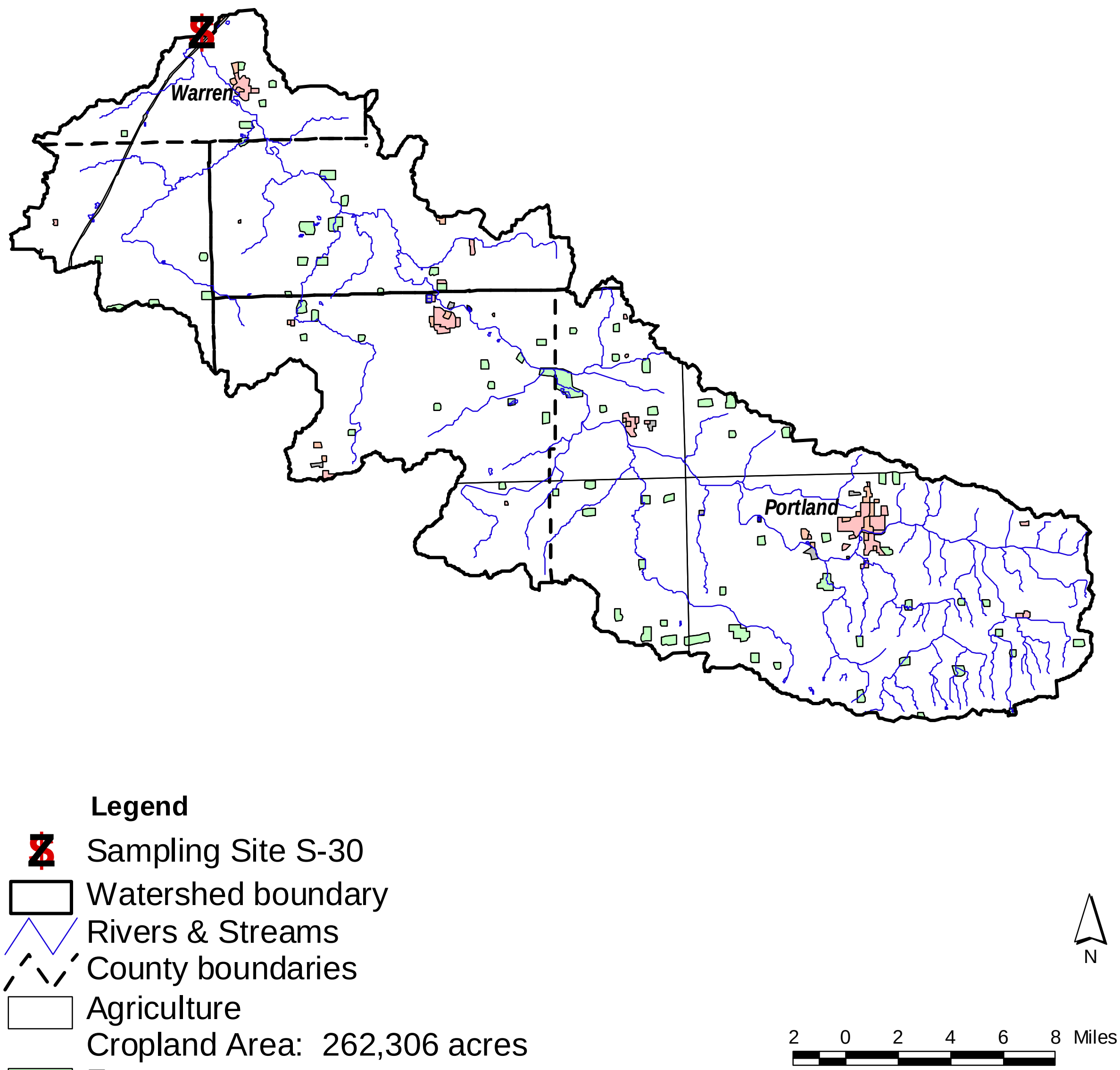


Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 14- Salamonie River near Warren

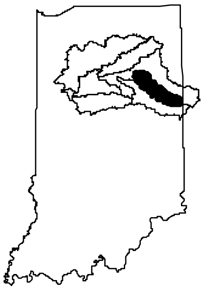
McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

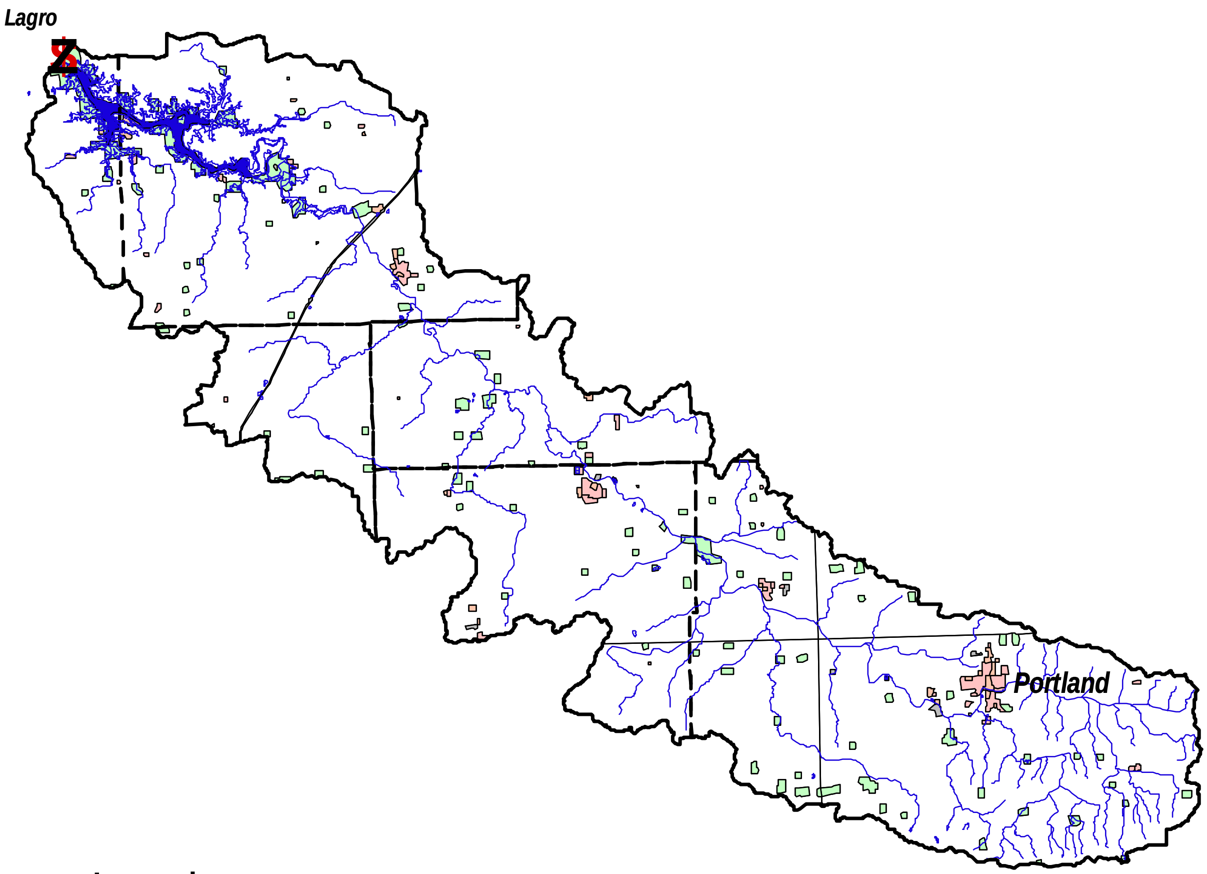
- Sampling Site S-30
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
- Cropland Area: 262,306 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 15- Salamonie River at Dora

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



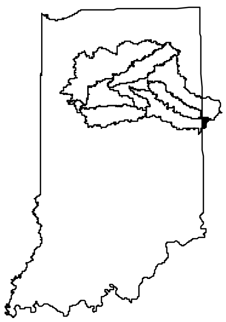
Legend

- Sampling Site S-3
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 337,682 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

N

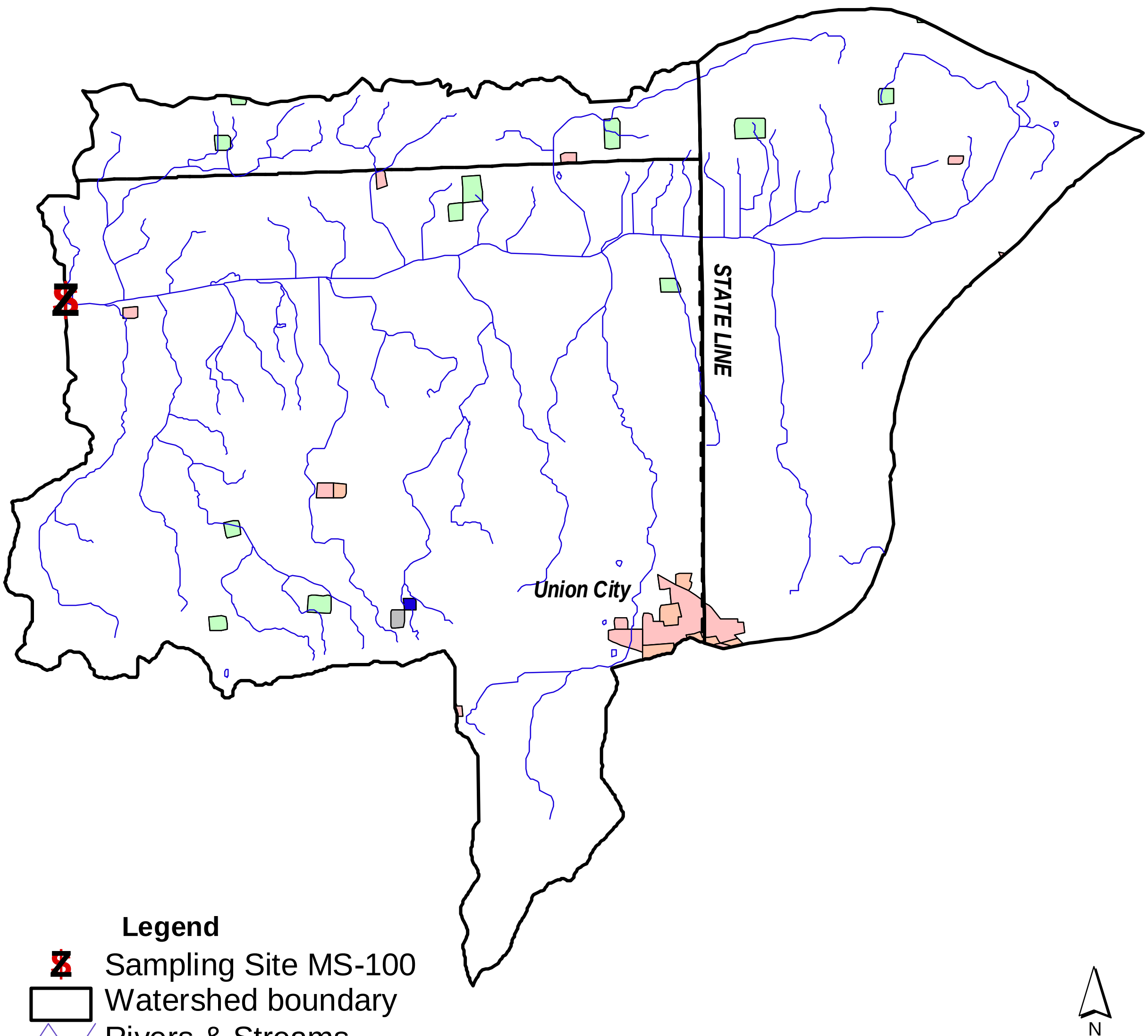
2 0 2 4 6 8 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 16- Mississinewa River near Ridgeville

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



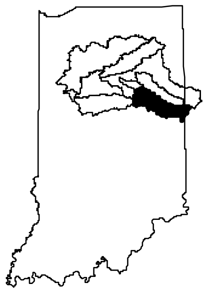
Legend

- Sampling Site MS-100
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 89,658 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

1 0 1 2 3 4 Miles

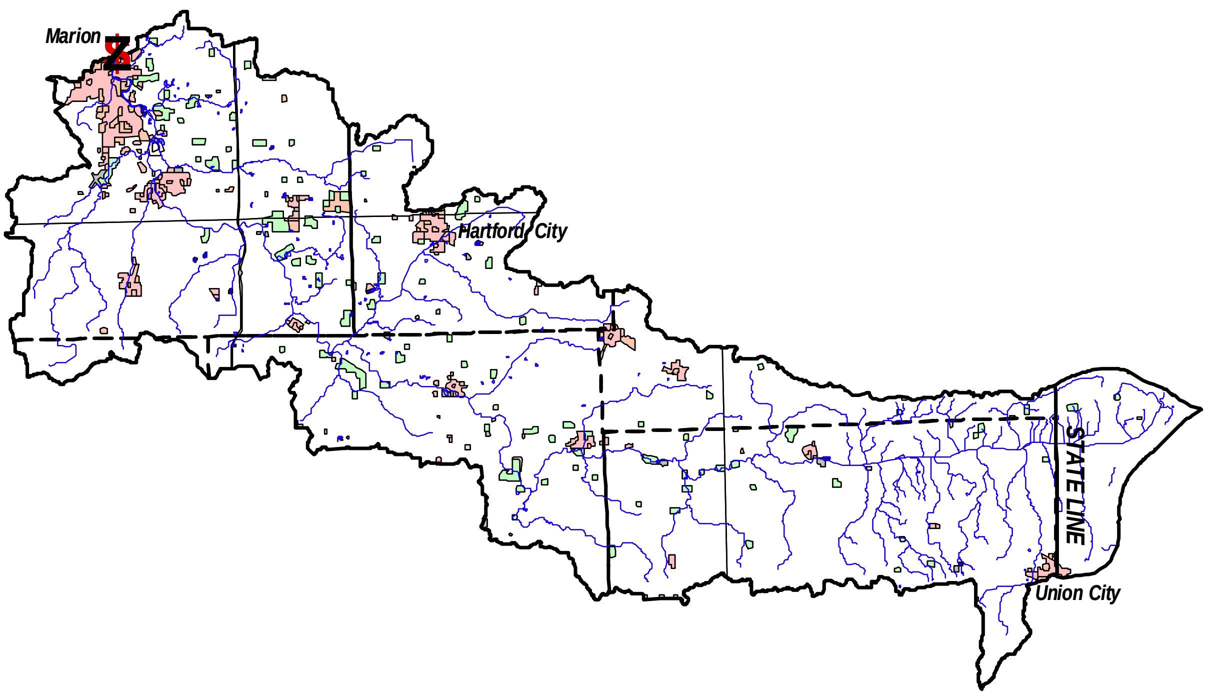
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 17- Mississinewa River at Marion

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

- Sampling Site MS-36
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 414,820 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

N

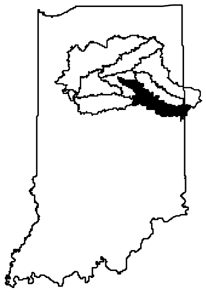
2 0 2 4 6 8 10 Miles

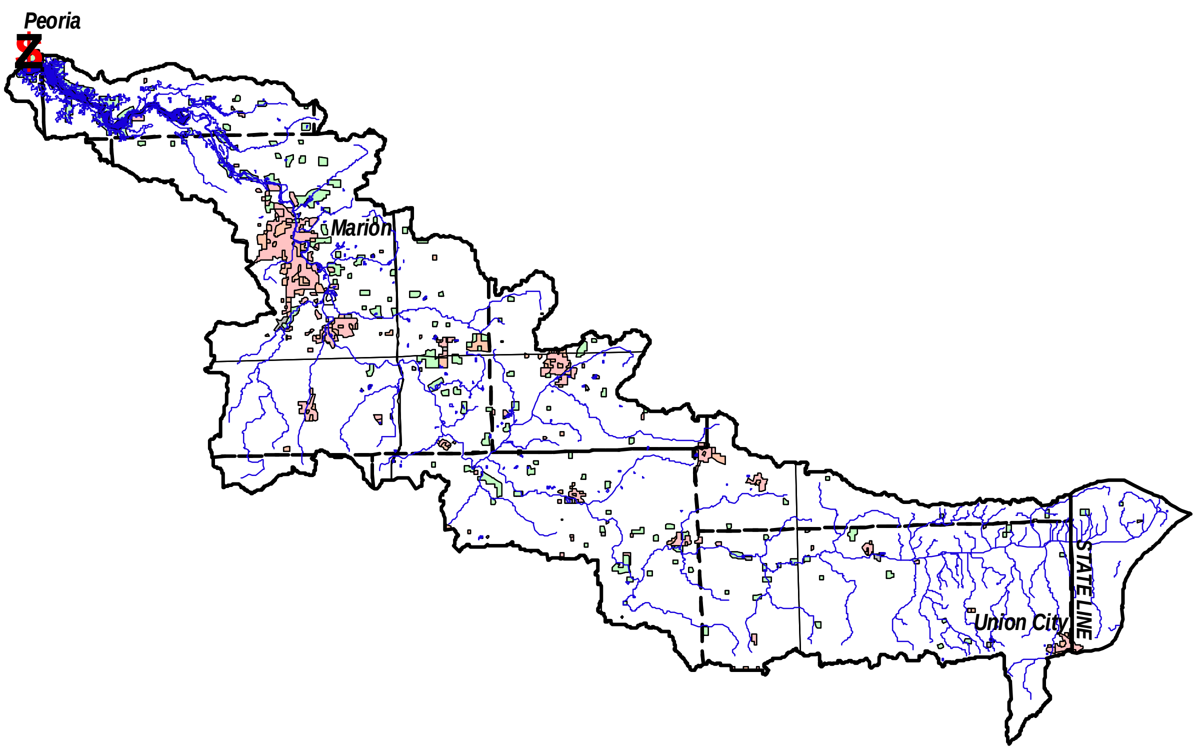
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan

Map 18- Mississinewa River at Peoria

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001





Legend

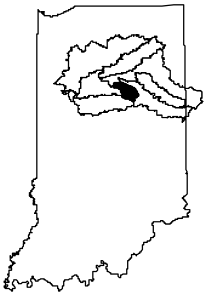
Sampling Site MS-7
Watershed boundary
Rivers & Streams
County boundaries
Agriculture
Cropland area: 483,489 acres
Forest
Lakes & Reservoirs
Industrial & Commercial
Urban & Residential
Other Land

N

4 0 4 8 12 Miles

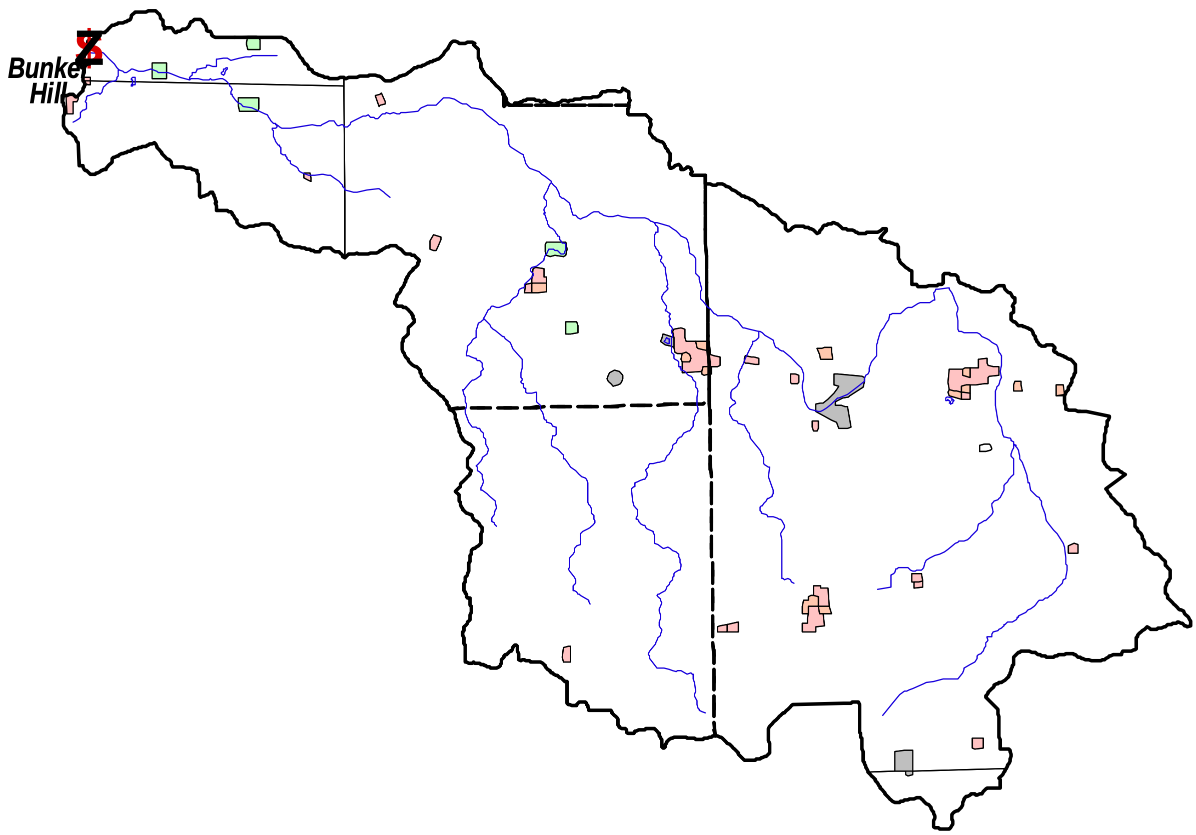
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



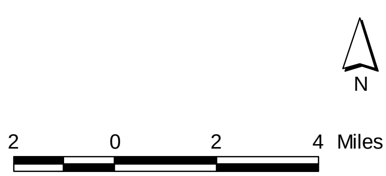
Map 19- Pipe Creek near Bunker Hill

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



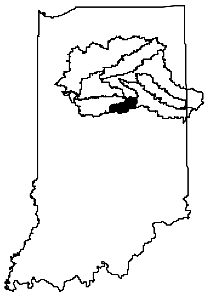
Legend

- Sampling Site PIP-11
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 99,377 acres
- Forest
- Industrial & Commercial
- Urban & Residential
- Other Land



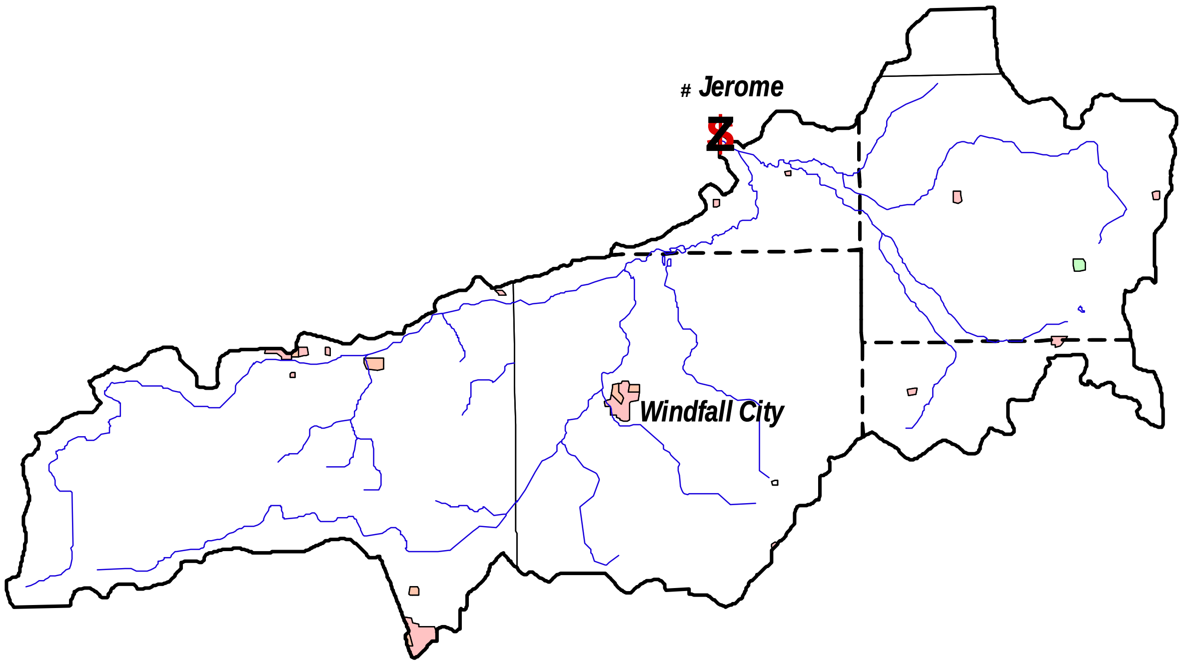
Map Reference

Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 20- Wildcat Creek near Jerome

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

Sampling Site WC-80
Watershed boundary
Rivers & Streams
County boundaries
Agriculture
Cropland Area: 92,752 acres
Forest
Industrial & Commercial
Urban & Residential

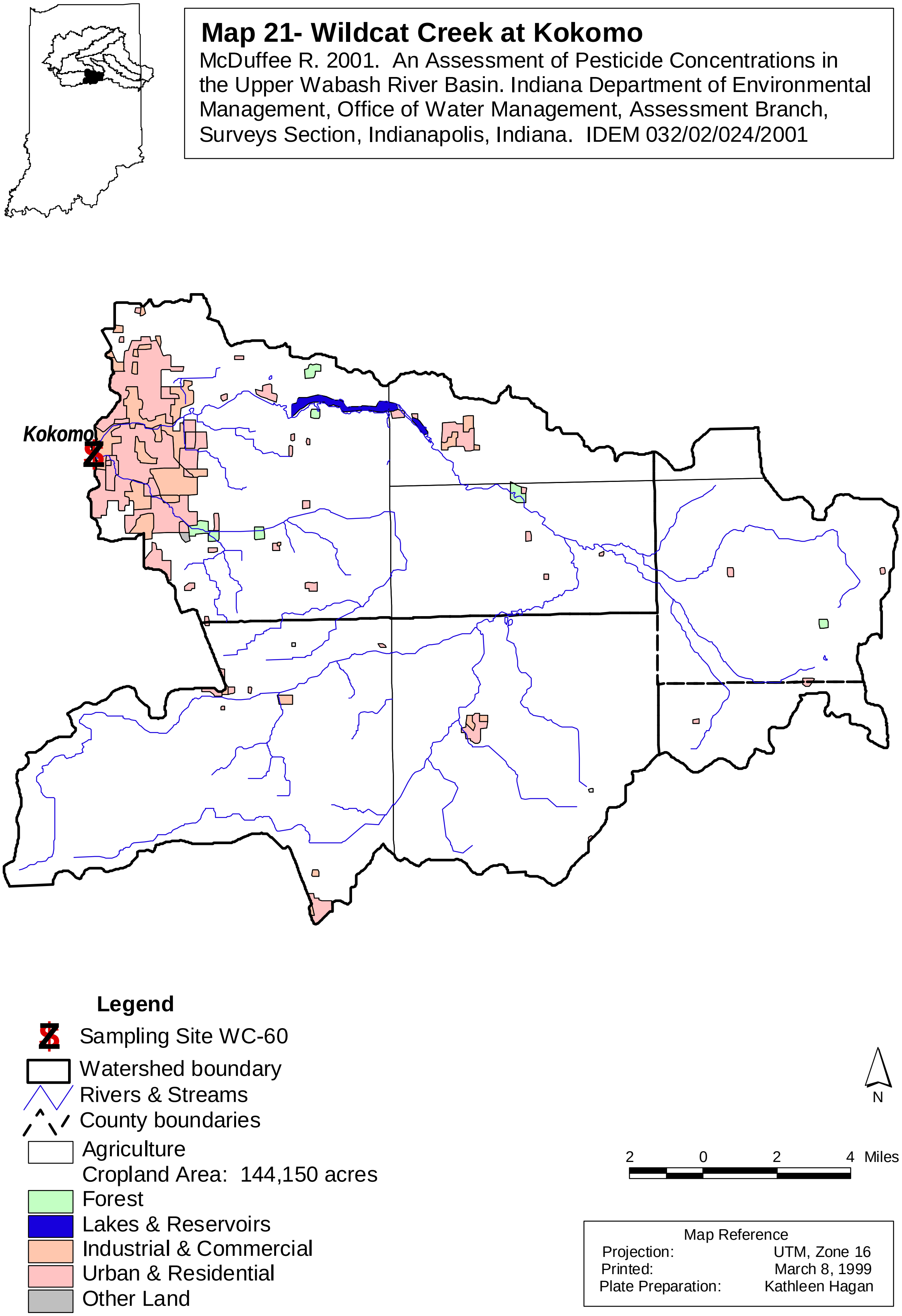
N

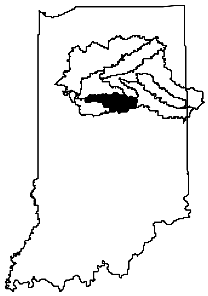
2 0 2 4 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan

Map 21- Wildcat Creek at Kokomo

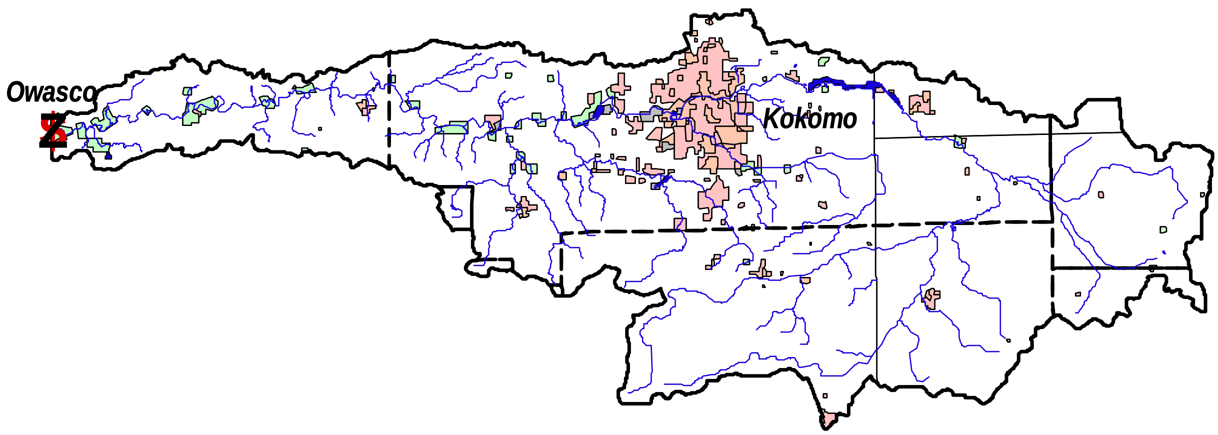
McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001





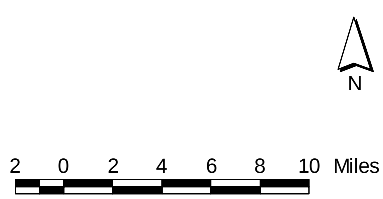
Map 22- Wildcat Creek at Owasco

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001

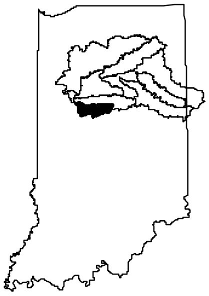


Legend

- Sampling Site WC-15
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 234,321 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land

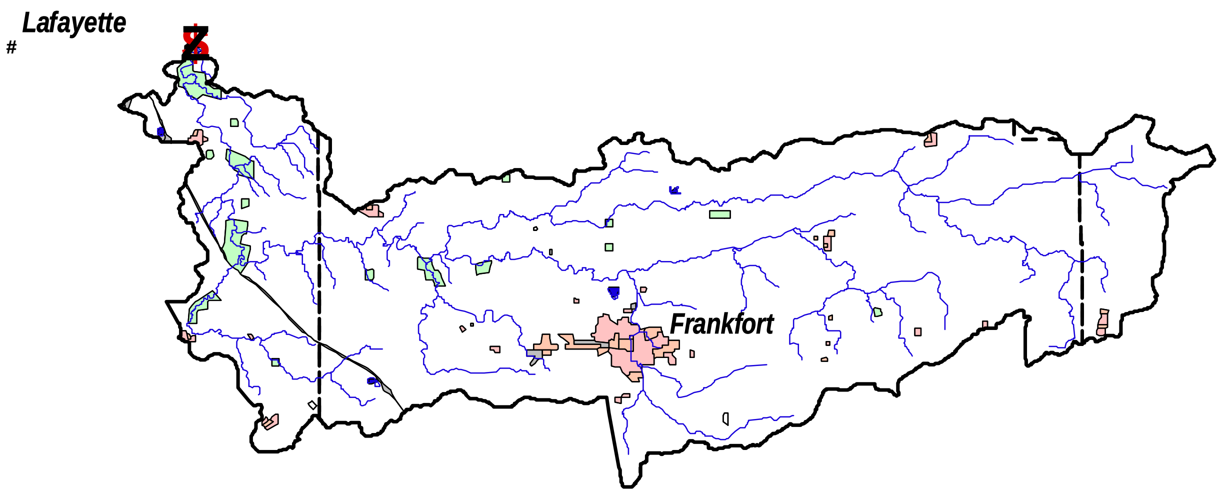


Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



Map 23- South Fork Wildcat Creek near Lafayette

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



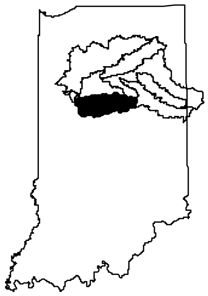
Legend

Sampling Site WCS-4
Watershed boundary
Rivers & Streams
County boundaries
Agriculture
Cropland Area: 1,598,657 acres
Forest
Lakes & Reservoirs
Industrial & Commercial
Urban & Residential
Other Land

N

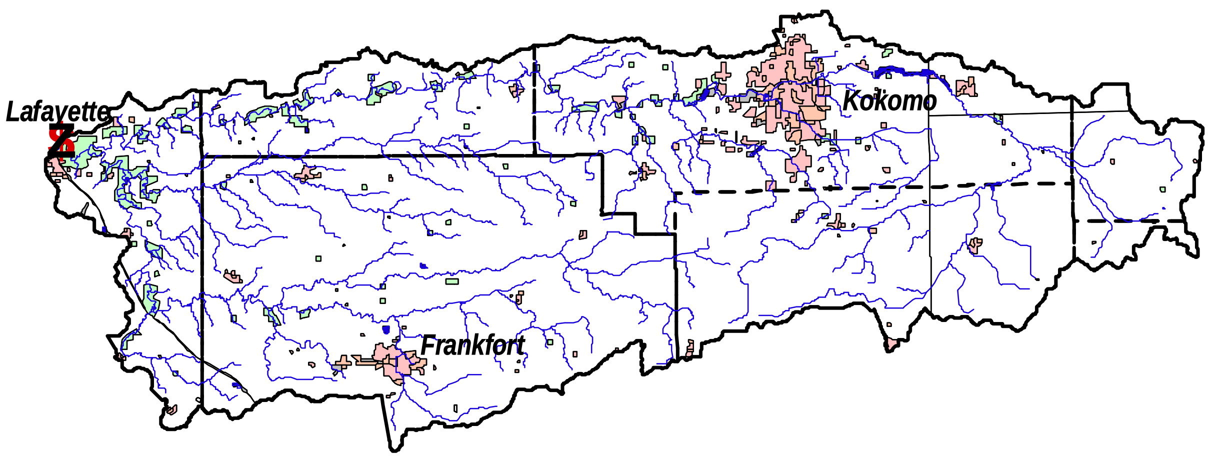
2 0 2 4 6 8 Miles

Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan



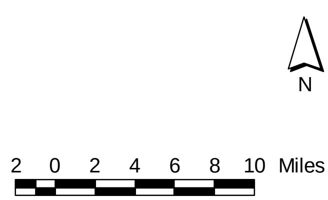
Map 24- Wildcat Creek near Lafayette

McDuffee R. 2001. An Assessment of Pesticide Concentrations in the Upper Wabash River Basin. Indiana Department of Environmental Management, Office of Water Management, Assessment Branch, Surveys Section, Indianapolis, Indiana. IDEM 032/02/024/2001



Legend

- Sampling Site WC-5
- Watershed boundary
- Rivers & Streams
- County boundaries
- Agriculture
  Cropland Area: 476,723 acres
- Forest
- Lakes & Reservoirs
- Industrial & Commercial
- Urban & Residential
- Other Land



Map Reference	
Projection:	UTM, Zone 16
Printed:	March 8, 1999
Plate Preparation:	Kathleen Hagan

APPENDIX II

Parameter List for SAS5
Modified EPA TEST Method 525.2

APPENDIX II

Parameter List for SAS5 Modified EPA Test Method 525.2

CAS Number	Compound	Detection Limits - μg/L
208-96-8	Acenaphthylene	0.1
34256-82-1	Acetochlor	0.1
15972-60-8	Alachlor	0.1
309-00-2	Aldrin	0.1
834-12-8	Ametryn	0.1
101-05-3	Anilazine	0.5
120-12-7	Anthracene	0.1
3244-90-4	Aspon	0.1
1610-17-9	Atraton	0.1
1912-24-9	Atrazine	0.1
86-50-0	Azinphos-methyl	0.1
1861-40-1	Benfluralin	0.1
56-55-3	Benzo[a]anthracene	0.1
205-99-2	Benzo[b]fluoranthene	0.1
207-08-9	Benzo[k]fluoranthene	0.1
191-24-2	Benzo[g,h,i]perylene	0.1
50-32-8	Benzo[a]pyrene	0.02
319-84-6	alpha-BHC	0.1
319-85-7	beta-BHC	0.1
319-86-8	delta-BHC	0.1
58-89-9	gamma-BHC (Lindane)	0.02
35400-43-2	Bolstar	0.1
314-40-9	Bromacil	0.1
23184-66-9	Butachlor	0.1
2008-41-5	Butylate	0.1
85-68-7	Butylbenzylphthalate	1
5234-68-4	Carboxin	0.1
5103-71-9	alpha-Chlordane	0.1
5103-74-2	gamma-Chlordane	0.1
2675-77-6	Chlorneb	0.1

CAS Number	Compound	Detection Limits - μg/L
510-15-6	Chloronbenzilate	0.1
2051-60-7	2-Chlorobiphenyl	0.1
5836-10-2	Chloropropylate	0.1
1897-45-6	Chlorothalonil	0.1
101-21-3	Chlorpropham	0.1
2921-88-2	Chlorpyrifos	0.1
218-01-9	Chrysene	0.1
81777-89-1	Clomazone	0.1
56-72-4	Coumaphos	0.1
21725-46-2	Cyanazine	0.1
1134-23-2	Cycloate	0.1
1861-32-1	DCPA	0.1
72-54-8	4,4'-DDD	0.1
72-55-9	4,4'-DDE	0.1
50-29-3	4,4'-DDT	0.1
8065-48-3	Demeton	0.1
NA	Desethylatrazine	1
NA	Desisopropylatrazine	1
53-70-3	Dibenzo[a,h]anthracene	0.1
84-74-2	Di-n-butylphthalate	1
333-41-5	Diazinon	0.1
1194-65-6	Dichlobenil	0.1
97-17-6	Dichlofenthion	0.1
99-30-9	Dichloran	0.1
16605-91-7	2,3-Dichlorobiphenyl	0.1
62-73-7	Dichlorvos	0.1
60-57-1	Dieldrin	0.1
103-23-1	Di(2-ethylhexyl)adipate	0.6
117-81-7	Di(2-ethylhexyl)phthalate	0.6
84-66-2	Diethylphthalate	1
60-51-5	Dimethoate	0.1
131-11-3	Dimethylphthalate	1
606-20-2	2,6-Dinitrotoluene	0.1
117-84-0	Di-n-octylphthalate	1

CAS Number	Compound	Detection Limits - μg/L
957-51-7	Diphenamid	0.1
298-04-4	Disulfoton	0.1
2497-06-5	Disulfoton sulfone	0.1
994-22-9	Dyfonate	0.1
759-94-4	EPTC	0.1
959-98-8	Endosulfan I	0.1
33213-65-9	Endosulfan II	0.1
1031-07-8	Endosulfan sulfate	0.1
72-20-8	Endrin	0.01
7421-93-4	Endrin aldehyde	0.1
55283-68-6	Ethalfluralin	0.1
563-12-2	Ethion	5
13194-48-4	Ethoprop	0.1
2593-15-9	Etridiazole	0.1
52-85-7	Famphur	0.1
22224-92-6	Fenamiphos	0.1
55-38-9	Fenthion	0.1
69806-50-4	Fluazifop-butyl	0.1
33245-39-5	Fluchloralin	0.1
2164-17-2	Fluometuron	0.1
206-44-0	Fluoranthene	0.1
86-73-7	Fluorene	0.1
76-44-8	Heptachlor	0.04
1024-57-3	Heptachlor epoxide	0.02
52663-71-5	2,2',3,3',4,4',6-Heptachlorobiphenyl	0.1
118-74-1	Hexachlorobenzene	0.1
60145-22-4	2,2',4,4'5,6'-Hexaclorobiphenyl	0.1
77-47-4	Hexachlorocyclopentadiene	0.1
51235-04-2	Hexazinone	0.1
193-39-5	Indeno[1,2,3-cd]pyrene	0.1
78-59-1	Isophorone	0.1
21609-90-5	Leptophos	0.5
113-48-4	MGK 264	0.1
136-45-8	MGK 326	0.1

CAS Number	Compound	Detection Limits - μg/L
121-75-5	Malathion	0.1
150-50-5	Merphos	0.1
72-43-5	Methoxychlor	0.1
90-12-0	1-Methylnaphthalene	0.1
91-57-6	2-Methylnaphthalene	0.1
950-35-6	Methyl paraoxon	0.1
51218-45-2	Metolachlor	0.1
21087-64-9	Metribuzin	0.1
7786-34-7	Mevinphos	0.1
2212-67-1	Molinate	0.1
91-20-3	Naphthalene	0.1
15299-99-7	Napropamide	0.1
39765-80-5	trans-Nonachlor	0.1
40186-71-8	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	0.1
19666-30-9	Oxadiazon	0.1
1114-71-2	Pebulate	0.1
40487-42-1	Pendimethalin	0.1
60233-25-2	2,2',3',4,6-Pentachlorobiphenyl	0.1
87-86-5	Pentachlorophenol	0.1
61949-76-6	cis-Permethrin	0.1
51877-74-8	trans-Permethrin	0.1
85-01-8	Phenanthrene	0.1
298-02-2	Phorate	0.1
26399-36-0	Profluralin	0.1
1610-18-0	Prometon	0.1
7287-19-6	Prometryn	0.1
23950-58-5	Pronamide	0.1
1918-16-7	Propachlor	0.1
709-98-8	Propanil	0.1
139-40-2	Propazine	0.1
129-00-0	Pyrene	0.1
122-34-9	Simazine	0.07
1014-70-6	Simetryn	0.1
22248-79-9	Stirofos	0.1

CAS Number	Compound	Detection Limits - μg/L
5902-51-2	Terbacil	0.1
13071-79-9	Terbufos	0.1
886-50-0	Terbutryn	0.1
2437-79-8	2,2',4,4'-Tetrachlorobiphenyl	0.1
28249-77-6	Thiobencarb	0.1
43121-43-3	Triademefon	0.1
78-48-8	Tribufos	0.1
15862-07-4	2,4,5-Trichlorobiphenyl	0.1
1582-09-8	Trifluralin	0.1
1929-77-7	Vernolate	0.1

APPENDIX III

Data Quality Assessment Levels

APPENDIX III

Data Quality Assessment Levels

Data Quality Level	Description
Level 1 **Screening data**	The results are usually generated onsite and have no QC checks. Analytical results, which have no QC checks or no precision or accuracy information or no detection limit calculations, but just numbers, are included in this category. Primarily, onsite data are used for presurveys and for preliminary rapid assessment
Level 2 **Field analysis data**	Data is recorded in the field or laboratory on calibrated or standardized equipment. Field duplicates are measured on a regular periodic basis. Calculations may be done in the field or later at the office. Analytical results, which have limited QC checks, are included in this category. Detection limits and ranges have been set for each analysis. The QC checks information for field or laboratory results is useable for estimating precision, accuracy, and completeness for the project. Data from this category is used independently for rapid assessment and preliminary decisions
Level 3 **Laboratory analytical data**	Analytical results include QC check samples for each batch of samples from which precision, accuracy, and completeness can be determined. Detection limits have been determined using 40 CFR Part 136 Appendix B, Revision 1.11. Raw data, chromatograms, spectrograms, and bench sheets are not included as part of the analytical report, but are maintained by the Contract Laboratory for easy retrieval and review. Data can be elevated from level 3 to level 4 by the inclusion of this information in the report. In addition, level 4 QC data must be reported using CLP forms or CLP format. Data falling under this category is considered as complete and is used for regulatory decisions
Level 4 **Enforcement data**	*Analytical results mostly meet the USEPA required Contract Laboratory Program (CLP) data analysis, contract required quantification limits (CRQL), and validation procedures.* QC data is reported on CLP forms or CLP format. Raw data, chromatograms, spectrograms, and bench sheets are included as part of the analytical report. Additionally, all reporting information required in the IDEM/BAA and in the Surface Water QAPP Table 11-1 are included. Data is legally quantitative in value, and is used for regulatory decisions

APPENDIX IV

Herbicide Concentrations and Stream Flows

Appendix IV
List of Tables

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-1 Station WB, Wabash River at Linn Grove

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/27/98	Acetochlor	0.5	540	N
05/06/98	Acetochlor	0.2	409	N
05/13/98	Acetochlor	0.2	232	N
05/20/98	Acetochlor	0.3	124	N
05/29/98	Acetochlor	1.9	104	N
06/05/98	Acetochlor	2.4	86	N
06/11/98	Acetochlor	0.6	93	N
06/17/98	Acetochlor	2.2	2484	N
06/24/98	Acetochlor	0.4	268	N
06/30/98	Acetochlor	1.4	1706	N
07/08/98	Acetochlor	0.2	1799	N
05/29/98	Alachlor	0.3	104	N
06/05/98	Alachlor	0.2	86	N
06/17/98	Alachlor	0.3	2484	N
06/24/98	Alachlor	0.1	268	N
06/30/98	Alachlor	0.2	1706	N
04/20/98	Atrazine	1.7	416	N
04/27/98	Atrazine	0.5	540	N
05/06/98	Atrazine	0.8	409	N
05/13/98	Atrazine	0.7	232	N
05/20/98	Atrazine	0.6	124	N
05/29/98	Atrazine	7.9	104	N
06/05/98	Atrazine	10	86	N
06/11/98	Atrazine	4.1	93	N
06/17/98	Atrazine	10	2484	N
06/24/98	Atrazine	3.5	268	N
06/30/98	Atrazine	6.7	1706	N
07/08/98	Atrazine	2.1	1799	N
07/15/98	Atrazine	1.7	160	N
07/21/98	Atrazine	2.5	622	N
07/29/98	Atrazine	0.6	873	N
06/05/98	Bromacil	0.5	86	N
06/17/98	Clomazone	0.1	2484	N
06/11/98	Cyanazine	0.4	93	N
06/17/98	Cyanazine	0.4	2484	N
06/30/98	Cyanazine	0.3	1706	N
04/20/98	Di(2-ethylhexyl)phthalate	10	416	N
04/27/98	Di(2-ethylhexyl)phthalate	1.2	540	N
07/21/98	Di(2-ethylhexyl)phthalate	1.8	622	N
04/20/98	Di-n-butylphthalate	11	416	N
05/06/98	Di-n-butylphthalate	1.1	409	N
07/15/98	Di-n-butylphthalate	1.4	160	N
07/21/98	Di-n-butylphthalate	1.9	622	N

Table IV-1 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/20/98	Metolachlor	1.8	416	N
04/27/98	Metolachlor	2.8	540	N
05/06/98	Metolachlor	3.3	409	N
05/13/98	Metolachlor	0.4	232	N
05/20/98	Metolachlor	0.9	124	N
05/29/98	Metolachlor	2.7	104	N
06/05/98	Metolachlor	2.9	86	N
06/11/98	Metolachlor	1.9	93	N
06/17/98	Metolachlor	7.7	2484	N
06/24/98	Metolachlor	2.0	268	N
06/30/98	Metolachlor	6.1	1706	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
07/08/98	Metolachlor	2.9	1799	N
07/15/98	Metolachlor	1.0	160	N
07/21/98	Metolachlor	1.4	622	N
07/29/98	Metolachlor	0.8	873	N
04/27/98	Simazine	0.18	540	N
05/29/98	Simazine	0.29	104	N
06/05/98	Simazine	0.51	86	N
06/11/98	Simazine	0.19	93	N
06/17/98	Simazine	0.25	2484	N
06/24/98	Simazine	0.13	268	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-2 Station WB-409, Wabash River at Huntington

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/06/98	Acetochlor	0.5	758	Y
05/06/98	Acetochlor	0.4	758	N
05/13/98	Acetochlor	1.9	406	N
05/20/98	Acetochlor	1.1	153	N
05/29/98	Acetochlor	2.0	107	N
06/05/98	Acetochlor	1.0	152	N
06/11/98	Acetochlor	1.0	115	N
06/17/98	Acetochlor	5.8	2230	N
06/24/98	Acetochlor	2.5	1940	N
06/30/98	Acetochlor	1.1	616	N
07/08/98	Acetochlor	0.5	1770	N
07/15/98	Acetochlor	0.2	235	N
07/21/98	Acetochlor	0.2	338	N
07/29/98	Acetochlor	0.2	4050	N
05/29/98	Alachlor	0.1	107	N
06/17/98	Alachlor	0.5	2230	N
06/24/98	Alachlor	0.3	1940	N
06/30/98	Alachlor	0.2	616	N
07/08/98	Alachlor	0.1	1770	N
04/20/98	Atrazine	0.2	2260	N
04/27/98	Atrazine	0.3	303	N
05/06/98	Atrazine	0.3	758	Y
05/06/98	Atrazine	0.6	758	N
05/13/98	Atrazine	3.0	406	N
05/20/98	Atrazine	1.7	153	N
05/29/98	Atrazine	5.7	107	N
06/05/98	Atrazine	3.9	152	N
06/11/98	Atrazine	4.9	115	N
06/17/98	Atrazine	21	2230	N
06/24/98	Atrazine	13	1940	N
06/30/98	Atrazine	7.5	616	N
07/08/98	Atrazine	2.9	1770	N
07/15/98	Atrazine	1.1	235	N
07/21/98	Atrazine	1.5	338	N
07/29/98	Atrazine	0.8	4050	N
04/20/98	Clomazone	0.1	2260	N
06/17/98	Clomazone	0.6	2230	N
06/24/98	Clomazone	0.3	1940	N
06/30/98	Clomazone	0.2	616	N
05/29/98	Cyanazine	0.3	107	N
06/05/98	Cyanazine	0.3	152	N
06/11/98	Cyanazine	0.3	115	N
06/24/98	Cyanazine	0.7	1940	N
06/30/98	Cyanazine	0.4	616	N
04/20/98	Di(2-ethylhexyl)phthalate	0.7	2260	N
04/27/98	Di(2-ethylhexyl)phthalate	1.5	303	N
05/06/98	Di(2-ethylhexyl)phthalate	1.9	758	Y
05/06/98	Di(2-ethylhexyl)phthalate	2.8	758	N
06/30/98	Di(2-ethylhexyl)phthalate	0.7	616	N
06/30/98	Diethylphthalate	1.1	616	N
04/27/98	Di-n-butylphthalate	2.4	303	N
05/06/98	Di-n-butylphthalate	1.8	758	Y
05/06/98	Di-n-butylphthalate	3.5	758	N
06/30/98	Di-n-butylphthalate	1.3	616	N

Table IV-2 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/20/98	Metolachlor	0.3	2260	N
04/27/98	Metolachlor	0.3	303	N
05/06/98	Metolachlor	0.7	758	N
05/06/98	Metolachlor	0.8	758	Y
05/13/98	Metolachlor	3.0	406	N
05/20/98	Metolachlor	2.1	153	N
05/29/98	Metolachlor	3.3	107	N
06/05/98	Metolachlor	2.2	152	N
06/11/98	Metolachlor	2.1	115	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/24/98	Metolachlor	6.7	1940	N
06/30/98	Metolachlor	3.6	616	N
07/08/98	Metolachlor	2.8	1770	N
07/15/98	Metolachlor	1.6	235	N
07/21/98	Metolachlor	1.8	338	N
07/29/98	Metolachlor	1.1	4050	N
05/29/98	Simazine	0.18	107	N
06/24/98	Simazine	0.30	1940	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-3 Station LR-8, Little River near Huntington

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/13/98	Acetochlor	0.2	98	N
05/20/98	Acetochlor	0.2	175	N
05/29/98	Acetochlor	0.2	46	N
06/11/98	Acetochlor	0.1	46	N
06/17/98	Acetochlor	2.1	215	N
06/24/98	Acetochlor	0.3	58	N
07/08/98	Acetochlor	0.2	102	N
07/15/98	Acetochlor	0.1	35	N
06/17/98	Alachlor	0.1	215	N
04/27/98	Atrazine	0.1	107	N
05/13/98	Atrazine	0.5	98	N
05/20/98	Atrazine	0.5	175	N
05/29/98	Atrazine	0.7	46	N
06/05/98	Atrazine	0.5	39	N
06/11/98	Atrazine	0.5	46	N
06/17/98	Atrazine	7.9	215	N
06/24/98	Atrazine	1.6	58	N
07/08/98	Atrazine	1.2	102	N
07/15/98	Atrazine	0.6	35	N
07/21/98	Atrazine	0.4	39	N
07/29/98	Atrazine	0.6	104	N
06/17/98	Clomazone	0.1	215	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/20/98	Di(2-ethylhexyl)phthalate	0.9	264	N
04/27/98	Di(2-ethylhexyl)phthalate	1.0	107	N
04/27/98	Di-n-butylphthalate	1.7	107	N
04/20/98	Metolachlor	0.2	264	N
04/27/98	Metolachlor	0.1	107	N
05/13/98	Metolachlor	0.6	98	N
05/20/98	Metolachlor	0.4	175	N
05/29/98	Metolachlor	0.4	46	N
06/05/98	Metolachlor	0.3	39	N
06/11/98	Metolachlor	0.2	46	N
06/17/98	Metolachlor	5.1	215	N
06/24/98	Metolachlor	1.1	58	N
07/08/98	Metolachlor	1.3	102	N
07/15/98	Metolachlor	0.5	35	N
07/21/98	Metolachlor	0.4	39	N
07/29/98	Metolachlor	0.6	104	N

Appendix IV. Herbicide Concentrations and Stream Flow

Table IV-4 Station S-30, Salamonie River near Warren

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/06/98	Acetochlor	0.2	245	N
05/13/98	Acetochlor	0.6	211	N
05/20/98	Acetochlor	0.4	102	N
05/29/98	Acetochlor	2.0	59	N
06/05/98	Acetochlor	5.1	65	N
06/11/98	Acetochlor	2.0	86	N
06/17/98	Acetochlor	3.6	2778	N
06/24/98	Acetochlor	0.6	136	N
06/30/98	Acetochlor	2.6	1450	N
06/30/98	Acetochlor	2.7	1450	Y
07/08/98	Acetochlor	0.4	5412	N
07/15/98	Acetochlor	0.1	115	N
07/21/98	Acetochlor	1.2	394	N
06/05/98	Alachlor	0.2	65	N
06/17/98	Alachlor	0.2	2778	N
05/06/98	Atrazine	0.6	245	N
05/13/98	Atrazine	1.2	211	N
05/20/98	Atrazine	0.9	102	N
05/29/98	Atrazine	7.4	59	N
06/05/98	Atrazine	17	65	N
06/11/98	Atrazine	8.9	86	N
06/17/98	Atrazine	17	2778	N
06/24/98	Atrazine	6.0	136	N
06/30/98	Atrazine	7.5	1450	N
06/30/98	Atrazine	5.1	1450	Y
07/08/98	Atrazine	2.7	5412	N
07/15/98	Atrazine	1.1	115	N
07/21/98	Atrazine	4.3	394	N
07/29/98	Atrazine	0.7	228	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/05/98	Clomazone	0.2	65	N
06/11/98	Clomazone	0.2	86	N
06/17/98	Clomazone	0.2	2778	N
06/24/98	Clomazone	0.1	136	N
07/08/98	Clomazone	0.1	5412	N
05/29/98	Cyanazine	0.3	59	N
06/05/98	Cyanazine	0.6	65	N
06/11/98	Cyanazine	0.3	86	N
06/17/98	Cyanazine	0.5	2778	N
06/24/98	Cyanazine	0.5	136	N
04/27/98	Di(2-ethylhexyl)adipate	0.7	675	N
04/20/98	Di(2-ethylhexyl)phthalate	0.9	234	N
06/30/98	Di(2-ethylhexyl)phthalate	1.0	1450	N
06/30/98	Di(2-ethylhexyl)phthalate	0.7	1450	Y
04/27/98	Dimethylphthalate	4.8	675	N
04/27/98	Di-n-butylphthalate	7.0	675	N

Table IV-4 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/20/98	Metolachlor	0.1	234	N
04/27/98	Metolachlor	3.3	675	N
05/06/98	Metolachlor	0.3	245	N
05/13/98	Metolachlor	1.1	211	N
05/20/98	Metolachlor	0.4	102	N
05/29/98	Metolachlor	1.5	59	N
06/05/98	Metolachlor	2.6	65	N
06/11/98	Metolachlor	2.3	86	N
06/17/98	Metolachlor	4.5	2778	N
06/24/98	Metolachlor	1.3	136	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/30/98	Metolachlor	5.0	1450	Y
06/30/98	Metolachlor	4.5	1450	N
07/08/98	Metolachlor	1.3	5412	N
07/15/98	Metolachlor	0.5	115	N
07/21/98	Metolachlor	1.1	394	N
07/29/98	Metolachlor	0.3	228	N
05/29/98	Simazine	0.60	59	N
06/05/98	Simazine	0.58	65	N
06/24/98	Simazine	0.12	136	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-5 Station S-3, Salamonie River at Dora

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/06/98	Acetochlor	0.4	560	N
05/13/98	Acetochlor	0.9	1380	N
05/20/98	Acetochlor	1.6	120	N
05/29/98	Acetochlor	2.1	79	N
06/05/98	Acetochlor	2.4	86	N
06/11/98	Acetochlor	2.1	95	N
06/17/98	Acetochlor	2.1	104	N
06/24/98	Acetochlor	2.7	1590	N
06/30/98	Acetochlor	4.4	4030	N
07/08/98	Acetochlor	2.0	1390	N
07/15/98	Acetochlor	1.5	4180	N
07/21/98	Acetochlor	0.9	454	N
07/29/98	Acetochlor	0.7	133	N
06/30/98	Alachlor	0.3	4030	N
07/08/98	Alachlor	0.1	1390	N
07/15/98	Alachlor	0.1	4180	N
04/20/98	Atrazine	0.2	2070	N
05/06/98	Atrazine	0.5	560	N
05/13/98	Atrazine	1.2	1380	N
05/20/98	Atrazine	2.3	120	N
05/29/98	Atrazine	4.5	79	N
06/05/98	Atrazine	5.4	86	N
06/11/98	Atrazine	4.9	95	N
06/17/98	Atrazine	5.4	104	N
06/24/98	Atrazine	9.1	1590	N
06/30/98	Atrazine	2.8	4030	N
07/08/98	Atrazine	1.5	1390	N
07/15/98	Atrazine	2.1	4180	N
07/21/98	Atrazine	1.7	454	N
07/29/98	Atrazine	1.9	133	N
06/05/98	Clomazone	0.1	86	N
06/11/98	Clomazone	0.1	95	N
06/30/98	Clomazone	0.4	4030	N
07/08/98	Clomazone	0.2	1390	N
07/15/98	Clomazone	0.2	4180	N
07/21/98	Clomazone	0.2	454	N
06/24/98	Cyanazine	0.6	1590	N
07/29/98	Cyanazine	0.2	133	N
04/20/98	Di(2-ethylhexyl)phthalate	1.1	2070	N
04/27/98	Di(2-ethylhexyl)phthalate	1.8	1570	N
06/24/98	Di(2-ethylhexyl)phthalate	0.8	1590	N
04/27/98	Di-n-butylphthalate	3.8	1570	N

Table IV-5 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/20/98	Metolachlor	0.2	2070	N
04/27/98	Metolachlor	0.2	1570	N
05/06/98	Metolachlor	0.3	560	N
05/13/98	Metolachlor	0.8	1380	N
05/20/98	Metolachlor	1.2	120	N
05/29/98	Metolachlor	1.9	79	N
06/05/98	Metolachlor	2.0	86	N
06/11/98	Metolachlor	1.8	95	N
06/17/98	Metolachlor	2.1	104	N
06/24/98	Metolachlor	2.8	1590	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/30/98	Metolachlor	5.8	4030	N
07/08/98	Metolachlor	2.6	1390	N
07/15/98	Metolachlor	2.7	4180	N
07/21/98	Metolachlor	2.1	454	N
07/29/98	Metolachlor	1.7	133	N
06/11/98	Metribuzin	0.2	95	N
06/05/98	Simazine	0.21	86	N
06/24/98	Simazine	0.15	1590	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-6 Station WB-387, Wabash River at Wabash

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/07/98	Acetochlor	0.3	1596	N
05/14/98	Acetochlor	0.3	1488	N
05/21/98	Acetochlor	2.0	474	N
05/29/98	Acetochlor	1.1	391	N
06/05/98	Acetochlor	1.1	466	N
06/11/98	Acetochlor	1.0	453	N
06/18/98	Acetochlor	5.2	3675	N
06/25/98	Acetochlor	2.6	25	N
07/01/98	Acetochlor	3.6	5035	N
07/09/98	Acetochlor	2.4	4403	N
07/16/98	Acetochlor	1.4	4764	N
07/22/98	Acetochlor	0.2	16900	N
07/30/98	Acetochlor	0.2	5057	N
06/18/98	Alachlor	0.5	3675	N
06/25/98	Alachlor	0.2	25	N
07/01/98	Alachlor	0.3	5035	N
07/09/98	Alachlor	0.2	4403	N
04/21/98	Atrazine	0.2	4278	N
04/28/98	Atrazine	0.1	834	N
05/07/98	Atrazine	0.7	1596	N
05/14/98	Atrazine	0.6	1488	N
05/21/98	Atrazine	2.7	474	N
05/29/98	Atrazine	3.2	391	N
06/05/98	Atrazine	3.6	466	N
06/11/98	Atrazine	3.9	453	N
06/18/98	Atrazine	18	3675	N
06/25/98	Atrazine	10	25	N
07/01/98	Atrazine	3.6	5035	N
07/09/98	Atrazine	3.2	4403	N
07/16/98	Atrazine	2.0	4764	N
07/22/98	Atrazine	0.7	16900	N
07/30/98	Atrazine	0.8	5057	N
04/21/98	Clomazone	0.1	4278	N
06/18/98	Clomazone	0.6	3675	N
06/25/98	Clomazone	0.2	25	N
07/01/98	Clomazone	0.3	5035	N
07/09/98	Clomazone	0.2	4403	N
07/16/98	Clomazone	0.2	4764	N
06/11/98	Cyanazine	0.4	453	N
06/25/98	Cyanazine	0.8	25	N
07/01/98	Cyanazine	0.5	5035	N
07/09/98	Cyanazine	0.6	4403	N
07/16/98	Cyanazine	0.4	4764	N
04/21/98	Di(2-ethylhexyl)phthalate	1.3	4278	N
06/25/98	Di(2-ethylhexyl)phthalate	0.8	25	N
07/30/98	Di(2-ethylhexyl)phthalate	0.9	5057	N
04/28/98	Di-n-butylphthalate	1.1	834	N

Table IV-6 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/21/98	Metolachlor	0.2	4278	N
04/28/98	Metolachlor	0.2	834	N
05/07/98	Metolachlor	0.6	1596	N
05/14/98	Metolachlor	0.5	1488	N
05/21/98	Metolachlor	1.5	474	N
05/29/98	Metolachlor	1.9	391	N
06/05/98	Metolachlor	1.7	466	N
06/11/98	Metolachlor	1.5	453	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/18/98	Metolachlor	10	3675	N
06/25/98	Metolachlor	4.1	25	N
07/01/98	Metolachlor	5.6	5035	N
07/09/98	Metolachlor	4.5	4403	N
07/16/98	Metolachlor	2.7	4764	N
07/22/98	Metolachlor	0.7	16900	N
07/30/98	Metolachlor	1.2	5057	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-7 Station MS-100, Mississinewa River near Ridgeville

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/13/98	Acetochlor	0.1	57	N
05/20/98	Acetochlor	14	142	N
05/29/98	Acetochlor	0.2	26	N
06/05/98	Acetochlor	0.4	29	N
06/11/98	Acetochlor	5.9	1617	N
06/11/98	Acetochlor	5.5	1617	Y
06/17/98	Acetochlor	0.8	552	N
06/24/98	Acetochlor	0.3	57	N
06/30/98	Acetochlor	0.9	725	N
07/08/98	Acetochlor	0.2	174	N
06/11/98	Alachlor	0.2	1617	N
06/11/98	Alachlor	0.2	1617	Y
06/30/98	Alachlor	0.1	725	N
04/20/98	Atrazine	0.2	56	N
04/27/98	Atrazine	0.3	76	N
05/13/98	Atrazine	0.6	57	N
05/20/98	Atrazine	32	142	N
05/29/98	Atrazine	1.5	26	N
06/05/98	Atrazine	6.8	29	N
06/11/98	Atrazine	36	1617	N
06/11/98	Atrazine	38	1617	Y
06/17/98	Atrazine	7.3	552	N
06/24/98	Atrazine	3.1	57	N
06/30/98	Atrazine	4.5	725	N
07/08/98	Atrazine	1.5	174	N
07/15/98	Atrazine	0.5	23	N
07/21/98	Atrazine	0.6	578	N
07/29/98	Atrazine	0.1	25	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/20/98	Clomazone	1.5	142	N
06/17/98	Clomazone	0.2	552	N
06/05/98	Cyanazine	0.2	29	N
06/11/98	Cyanazine	3.8	1617	N
06/24/98	Cyanazine	0.2	57	N
04/20/98	Di(2-ethylhexyl)phthalate	0.8	56	N
06/11/98	Di(2-ethylhexyl)phthalate	2.0	1617	Y
06/11/98	Di(2-ethylhexyl)phthalate	1.1	1617	N
06/30/98	Di(2-ethylhexyl)phthalate	1.0	725	N
04/27/98	Di-n-butylphthalate	1.0	76	N
04/20/98	Metolachlor	0.2	56	N
04/27/98	Metolachlor	0.4	76	N
05/13/98	Metolachlor	0.4	57	N
05/20/98	Metolachlor	37	142	N
05/29/98	Metolachlor	0.9	26	N
06/05/98	Metolachlor	6.4	29	N
06/11/98	Metolachlor	41	1617	N
06/11/98	Metolachlor	38	1617	Y
06/17/98	Metolachlor	8.1	552	N
06/24/98	Metolachlor	2.1	57	N
06/30/98	Metolachlor	6.2	725	N
07/08/98	Metolachlor	1.4	174	N
07/15/98	Metolachlor	0.5	23	N
07/21/98	Metolachlor	0.6	578	N
07/29/98	Metolachlor	0.6	25	N
04/27/98	Metribuzin	0.6	76	N

Table IV-7 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/11/98	Pendimethalin	0.2	1617	Y

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/17/98	Simazine	0.12	552	N
06/24/98	Simazine	0.09	57	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-8 Station MS-36, Mississinewa River at Marion

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/06/98	Acetochlor	0.5	599	N
05/13/98	Acetochlor	0.3	4805	N
05/20/98	Acetochlor	0.2	223	N
05/29/98	Acetochlor	1.0	206	N
06/05/98	Acetochlor	3.9	232	N
06/11/98	Acetochlor	0.7	644	N
06/17/98	Acetochlor	1.6	6544	N
06/24/98	Acetochlor	0.5	431	N
06/30/98	Acetochlor	0.2	588	N
07/08/98	Acetochlor	0.2	2618	N
06/05/98	Alachlor	0.3	232	N
06/11/98	Alachlor	0.1	644	N
06/17/98	Alachlor	0.2	6544	N
07/21/98	Alachlor	0.2	217	N
04/20/98	Atrazine	0.2	610	N
04/30/98	Atrazine	0.2	457	Y
04/30/98	Atrazine	0.1	457	N
05/06/98	Atrazine	1.3	599	N
05/13/98	Atrazine	1.3	4805	N
05/20/98	Atrazine	0.8	223	N
05/29/98	Atrazine	4.3	206	N
06/05/98	Atrazine	23	232	N
06/11/98	Atrazine	5.9	644	N
06/17/98	Atrazine	13	6544	N
06/24/98	Atrazine	5.7	431	N
06/30/98	Atrazine	2.2	588	N
07/08/98	Atrazine	2.0	2618	N
07/15/98	Atrazine	0.8	264	N
07/21/98	Atrazine	0.9	217	N
07/29/98	Atrazine	0.2	362	N
06/11/98	Bromacil	0.7	644	N
04/30/98	Clomazone	0.1	457	Y
05/06/98	Clomazone	0.1	599	N
06/05/98	Clomazone	0.1	232	N
06/17/98	Clomazone	0.2	6544	N
06/30/98	Clomazone	0.2	588	N
05/29/98	Cyanazine	0.2	206	N
06/05/98	Cyanazine	1.3	232	N
06/17/98	Cyanazine	0.5	6544	N
06/24/98	Cyanazine	0.7	431	N
07/15/98	Cyanazine	0.1	264	N
04/20/98	Di(2-ethylhexyl)phthalate	0.7	610	N
04/30/98	Di(2-ethylhexyl)phthalate	1.0	457	N
05/06/98	Di(2-ethylhexyl)phthalate	1.3	599	N
06/24/98	Di(2-ethylhexyl)phthalate	1.2	431	N
04/30/98	Di-n-butylphthalate	2.9	457	N
05/06/98	Di-n-butylphthalate	1.3	599	N
06/11/98	Fluoranthene	0.2	644	N

Table IV-8 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/20/98	Metolachlor	0.2	610	N
04/30/98	Metolachlor	0.2	457	Y
04/30/98	Metolachlor	0.2	457	N
05/06/98	Metolachlor	0.7	599	N
05/13/98	Metolachlor	0.8	4805	N
05/20/98	Metolachlor	0.3	223	N
05/29/98	Metolachlor	2.2	206	N
06/05/98	Metolachlor	6.7	232	N
06/11/98	Metolachlor	1.9	644	N
06/17/98	Metolachlor	6.4	6544	N
06/24/98	Metolachlor	1.8	431	N
06/30/98	Metolachlor	0.9	588	N
07/08/98	Metolachlor	1.2	2618	N
07/15/98	Metolachlor	0.5	264	N
07/21/98	Metolachlor	0.7	217	N
07/29/98	Metolachlor	0.4	362	N
04/30/98	Metribuzin	0.1	457	Y
06/11/98	Pyrene	0.2	644	N
05/29/98	Simazine	0.29	206	N
06/05/98	Simazine	1.5	232	N
06/24/98	Simazine	0.15	431	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-9 Station MS-7, Mississinewa River at Peoria

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/14/98	Acetochlor	0.2	466	N
05/21/98	Acetochlor	0.3	217	N
05/28/98	Acetochlor	0.4	288	N
06/04/98	Acetochlor	0.7	601	N
06/10/98	Acetochlor	0.6	288	N
06/18/98	Acetochlor	1.6	1350	N
06/25/98	Acetochlor	2.5	5270	N
07/01/98	Acetochlor	1.7	3240	N
07/09/98	Acetochlor	0.9	1540	N
07/16/98	Acetochlor	0.4	4770	N
07/22/98	Acetochlor	0.6	90	N
07/30/98	Acetochlor	0.2	3940	N
06/25/98	Alachlor	0.2	5270	N
07/01/98	Alachlor	0.1	3240	N
07/09/98	Alachlor	0.1	1540	N
04/21/98	Atrazine	0.2	4200	N
04/28/98	Atrazine	0.3	466	N
05/14/98	Atrazine	0.7	466	N
05/21/98	Atrazine	1.4	217	N
05/28/98	Atrazine	2.8	288	N
06/04/98	Atrazine	4.4	601	N
06/10/98	Atrazine	4.3	288	N
06/18/98	Atrazine	9.3	1350	N
06/25/98	Atrazine	17	5270	N
07/01/98	Atrazine	12	3240	N
07/09/98	Atrazine	6.5	1540	N
07/16/98	Atrazine	1.6	4770	N
07/22/98	Atrazine	1.0	90	N
07/30/98	Atrazine	1.0	3940	N
06/04/98	Clomazone	0.1	601	N
06/10/98	Clomazone	0.1	288	N
06/18/98	Clomazone	0.1	1350	N
06/25/98	Clomazone	0.3	5270	N
07/01/98	Clomazone	0.2	3240	N
07/09/98	Clomazone	0.2	1540	N
05/28/98	Cyanazine	0.2	288	N
06/10/98	Cyanazine	0.4	288	N
06/18/98	Cyanazine	0.8	1350	N
06/25/98	Cyanazine	1.6	5270	N
07/01/98	Cyanazine	0.8	3240	N
07/09/98	Cyanazine	0.5	1540	N
07/16/98	Cyanazine	0.3	4770	N
07/30/98	Cyanazine	0.2	3940	N
04/21/98	Di(2-ethylhexyl)phthalate	1.2	4200	N
04/28/98	Di(2-ethylhexyl)phthalate	1.8	466	N
04/28/98	Di-n-butylphthalate	4.5	466	N
05/07/98	Di-n-butylphthalate	1.1	467	N

Table IV-9 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/21/98	Metolachlor	0.3	4200	N
04/28/98	Metolachlor	0.3	466	N
05/07/98	Metolachlor	0.5	467	N
05/14/98	Metolachlor	0.6	466	N
05/21/98	Metolachlor	0.8	217	N
05/28/98	Metolachlor	1.2	288	N
06/04/98	Metolachlor	1.6	601	N
06/10/98	Metolachlor	1.5	288	N
06/18/98	Metolachlor	2.4	1350	N
06/25/98	Metolachlor	7.0	5270	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
07/01/98	Metolachlor	5.5	3240	N
07/09/98	Metolachlor	3.9	1540	N
07/16/98	Metolachlor	2.1	4770	N
07/22/98	Metolachlor	2.7	90	N
07/30/98	Metolachlor	1.2	3940	N
05/28/98	Simazine	0.21	288	N
06/04/98	Simazine	0.32	601	N
06/10/98	Simazine	0.27	288	N
06/18/98	Simazine	0.47	1350	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-10 Station WB-370, Wabash River at Peru

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/07/98	Acetochlor	0.3	2500	N
05/14/98	Acetochlor	0.7	2072	N
05/21/98	Acetochlor	1.1	757	N
05/28/98	Acetochlor	0.8	861	N
06/04/98	Acetochlor	1.1	1548	N
06/10/98	Acetochlor	0.7	677	N
06/18/98	Acetochlor	5.2	5050	N
06/25/98	Acetochlor	2.7	7342	N
07/01/98	Acetochlor	3.7	8512	N
07/09/98	Acetochlor	1.8	5141	N
07/16/98	Acetochlor	1.2	8796	N
07/22/98	Acetochlor	0.2	2420	N
07/30/98	Acetochlor	0.2	8531	N
06/18/98	Alachlor	0.5	5050	N
06/25/98	Alachlor	0.2	7342	N
07/01/98	Alachlor	0.3	8512	N
07/09/98	Alachlor	0.1	5141	N
07/16/98	Alachlor	0.1	8796	N
04/21/98	Atrazine	0.2	8399	N
04/28/98	Atrazine	0.2	1503	N
05/07/98	Atrazine	0.7	2500	N
05/14/98	Atrazine	1.8	2072	N
05/21/98	Atrazine	1.8	757	N
05/28/98	Atrazine	2.6	861	N
06/04/98	Atrazine	4.1	1548	N
06/10/98	Atrazine	3.7	677	N
06/18/98	Atrazine	15	5050	N
06/25/98	Atrazine	13	7342	N
07/01/98	Atrazine	6.0	8512	N
07/09/98	Atrazine	3.3	5141	N
07/30/98	Atrazine	1.0	8531	N
07/01/98	Clomazone	0.3	8512	N
07/09/98	Clomazone	0.2	5141	N
07/16/98	Clomazone	0.1	8796	N
05/14/98	Cyanazine	0.4	2072	N
06/25/98	Cyanazine	1.0	7342	N
07/09/98	Cyanazine	0.3	5141	N
04/21/98	Di(2-ethylhexyl)phthalate	0.6	8399	N
07/22/98	Di(2-ethylhexyl)phthalate	0.7	2420	N
04/28/98	Di-n-butylphthalate	1.4	1503	N
05/07/98	Di-n-butylphthalate	1.1	2500	N
05/21/98	Di-n-butylphthalate	1.1	757	N
06/18/98	Fluoranthene	0.7	5050	N
07/16/98	Fluoranthene	1.5	8796	N

Table IV-10 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/21/98	Metolachlor	0.2	8399	N
04/28/98	Metolachlor	0.2	1503	N
05/07/98	Metolachlor	0.6	2500	N
05/14/98	Metolachlor	1.0	2072	N
05/21/98	Metolachlor	1.2	757	N
05/28/98	Metolachlor	1.8	861	N
06/04/98	Metolachlor	2.1	1548	N
06/10/98	Metolachlor	1.4	677	N
06/18/98	Metolachlor	11	5050	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/25/98	Metolachlor	6.1	7342	N
07/01/98	Metolachlor	7.0	8512	N
07/09/98	Metolachlor	3.4	5141	N
07/16/98	Metolachlor	2.9	8796	N
07/22/98	Metolachlor	1.0	2420	N
07/30/98	Metolachlor	1.2	8531	N
07/16/98	Pyrene	1.2	8796	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-11 Station PIP-11, Pipe Creek near Bunker Hill

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/21/98	Acetochlor	0.6	117	N
04/28/98	Acetochlor	2.1	95	N
05/14/98	Acetochlor	0.9	127	N
05/21/98	Acetochlor	0.3	74	N
05/22/98	Acetochlor	0.4	74	Y
05/28/98	Acetochlor	0.2	54	N
06/04/98	Acetochlor	0.4	37	N
06/10/98	Acetochlor	0.1	34	N
06/18/98	Acetochlor	0.6	452	N
06/25/98	Acetochlor	0.2	103	N
07/01/98	Acetochlor	0.2	205	N
07/09/98	Acetochlor	0.1	771	N
07/22/98	Acetochlor	0.1	2841	N
04/28/98	Alachlor	0.2	95	N
04/21/98	Atrazine	0.4	117	N
04/28/98	Atrazine	4.2	95	N
05/14/98	Atrazine	1.8	127	N
05/21/98	Atrazine	1.0	74	N
05/22/98	Atrazine	1.0	74	Y
05/28/98	Atrazine	1.6	54	N
06/04/98	Atrazine	0.8	37	N
06/10/98	Atrazine	0.6	34	N
06/18/98	Atrazine	5.2	452	N
06/25/98	Atrazine	1.7	103	N
07/01/98	Atrazine	2.1	205	N
07/09/98	Atrazine	1.1	771	N
07/16/98	Atrazine	0.4	86	N
07/22/98	Atrazine	0.4	2841	N
07/30/98	Atrazine	0.3	123	N
04/28/98	Clomazone	0.3	95	N
06/18/98	Clomazone	0.2	452	N
07/09/98	Clomazone	0.1	771	N
07/22/98	Clomazone	0.1	2841	N
05/28/98	Cyanazine	0.3	54	N
06/04/98	Cyanazine	0.2	37	N
06/18/98	Cyanazine	0.7	452	N
06/25/98	Cyanazine	0.4	103	N
04/21/98	Di(2-ethylhexyl)phthalate	2.3	117	N
04/28/98	Di(2-ethylhexyl)phthalate	1.4	95	N
05/07/98	Di(2-ethylhexyl)phthalate	0.7	174	N
07/16/98	Di(2-ethylhexyl)phthalate	0.6	86	N
07/09/98	Fluoranthene	0.3	771	N

Table IV-11 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICAT (Y/N)
04/21/98	Metolachlor	0.7	117	N
04/28/98	Metolachlor	5.6	95	N
05/07/98	Metolachlor	1.8	174	N
05/14/98	Metolachlor	1.2	127	N
05/21/98	Metolachlor	1.8	74	N
05/22/98	Metolachlor	2.0	74	Y
05/28/98	Metolachlor	1.1	54	N
06/04/98	Metolachlor	0.5	37	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/10/98	Metolachlor	0.5	34	N
06/18/98	Metolachlor	4.5	452	N
06/25/98	Metolachlor	2.3	103	N
07/01/98	Metolachlor	2.2	205	N
07/09/98	Metolachlor	2.7	771	N
07/16/98	Metolachlor	0.2	86	N
07/22/98	Metolachlor	1.6	2841	N
07/30/98	Metolachlor	1.0	123	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-12 Station ELL-53, Eel River at North Manchester

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/07/98	Acetochlor	0.2	411	N
05/21/98	Acetochlor	0.2	159	N
05/28/98	Acetochlor	0.5	452	N
06/04/98	Acetochlor	0.2	110	N
06/18/98	Acetochlor	2.5	441	N
06/25/98	Acetochlor	0.3	157	N
07/01/98	Acetochlor	0.9	229	N
07/09/98	Acetochlor	0.3	300	N
07/16/98	Acetochlor	0.1	108	N
07/22/98	Acetochlor	0.3	6683	N
06/18/98	Alachlor	0.2	441	N
05/07/98	Atrazine	0.6	411	N
05/14/98	Atrazine	0.3	244	N
05/21/98	Atrazine	0.2	159	N
05/28/98	Atrazine	0.6	452	N
06/04/98	Atrazine	0.3	110	N
06/10/98	Atrazine	0.2	110	N
06/18/98	Atrazine	8.3	441	N
06/25/98	Atrazine	1.4	157	N
07/01/98	Atrazine	2.9	229	N
07/09/98	Atrazine	1.5	300	N
07/16/98	Atrazine	0.4	108	N
07/22/98	Atrazine	0.5	6683	N
07/30/98	Atrazine	0.4	210	N
04/28/98	Di(2-ethylhexyl)phthalate	1.1	284	N
06/10/98	Di(2-ethylhexyl)phthalate	0.7	110	N
04/28/98	Di-n-butylphthalate	1.8	284	N
04/28/98	Metolachlor	0.1	284	N
05/07/98	Metolachlor	0.4	411	N
05/14/98	Metolachlor	0.2	244	N
05/21/98	Metolachlor	0.2	159	N
05/28/98	Metolachlor	0.2	452	N
06/04/98	Metolachlor	0.2	110	N
06/10/98	Metolachlor	0.1	110	N
06/18/98	Metolachlor	5.0	441	N
06/25/98	Metolachlor	0.9	157	N
07/01/98	Metolachlor	2.6	229	N
07/09/98	Metolachlor	1.1	300	N
07/16/98	Metolachlor	0.2	108	N
07/22/98	Metolachlor	0.6	6683	N
07/30/98	Metolachlor	0.3	210	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-13 Station ELL-7, Eel River near Logansport

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/28/98	Acetochlor	0.1	705	N
05/07/98	Acetochlor	0.5	2832	N
05/21/98	Acetochlor	14	686	N
05/28/98	Acetochlor	1.7	452	N
06/04/98	Acetochlor	1.2	388	N
06/10/98	Acetochlor	0.2	369	N
06/18/98	Acetochlor	3.3	1543	N
06/25/98	Acetochlor	0.4	521	N
07/01/98	Acetochlor	0.4	537	N
07/09/98	Acetochlor	0.4	1185	N
07/22/98	Acetochlor	0.1	9110	N
05/28/98	Alachlor	0.2	452	N
06/04/98	Alachlor	0.1	388	N
06/10/98	Alachlor	0.2	369	N
06/18/98	Alachlor	0.3	1543	N
06/25/98	Alachlor	0.1	521	N
07/01/98	Alachlor	0.2	537	N
07/09/98	Alachlor	0.1	1185	N
04/21/98	Atrazine	0.1	1040	N
04/28/98	Atrazine	0.2	705	N
05/07/98	Atrazine	1.5	2832	N
05/14/98	Atrazine	0.2	731	N
05/21/98	Atrazine	18	686	N
05/28/98	Atrazine	2.2	452	N
06/04/98	Atrazine	1.4	388	N
06/10/98	Atrazine	0.6	369	N
06/18/98	Atrazine	8.8	1543	N
06/25/98	Atrazine	2.2	521	N
07/01/98	Atrazine	1.0	537	N
07/09/98	Atrazine	0.9	1185	N
07/16/98	Atrazine	0.6	417	N
07/22/98	Atrazine	0.5	9110	N
07/30/98	Atrazine	0.4	811	N
04/21/98	Di(2-ethylhexyl)phthalate	0.8	1040	N
04/28/98	Di(2-ethylhexyl)phthalate	0.8	705	N
07/30/98	Di(2-ethylhexyl)phthalate	0.6	811	N
04/21/98	Di-n-butylphthalate	1.8	1040	N
04/28/98	Di-n-butylphthalate	1.4	705	N
05/07/98	Metolachlor	1.0	2832	N
05/14/98	Metolachlor	0.3	731	N
05/21/98	Metolachlor	9.9	686	N
05/28/98	Metolachlor	0.5	452	N
06/04/98	Metolachlor	0.4	388	N
06/10/98	Metolachlor	0.2	369	N
06/18/98	Metolachlor	6.6	1543	N
06/25/98	Metolachlor	1.1	521	N
07/01/98	Metolachlor	0.8	537	N
07/09/98	Metolachlor	1.2	1185	N
07/16/98	Metolachlor	0.3	417	N
07/22/98	Metolachlor	0.5	9110	N
07/30/98	Metolachlor	0.3	811	N
05/21/98	Propachlor	0.1	686	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-14 Station WB-354, Wabash River at Logansport

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/07/98	Acetochlor	0.5	3820	N
05/14/98	Acetochlor	0.7	3280	N
05/21/98	Acetochlor	0.7	1631	N
05/28/98	Acetochlor	0.8	1445	N
06/04/98	Acetochlor	1.0	1932	N
06/10/98	Acetochlor	0.4	1113	N
06/18/98	Acetochlor	4.6	7250	N
06/25/98	Acetochlor	2.7	8764	N
07/01/98	Acetochlor	2.7	10210	N
07/09/98	Acetochlor	1.2	8672	N
07/16/98	Acetochlor	0.1	9987	N
07/22/98	Acetochlor	0.2	36960	N
07/30/98	Acetochlor	0.2	10500	N
06/25/98	Alachlor	0.3	8764	N
07/01/98	Alachlor	0.2	10210	N
07/22/98	Alachlor	0.1	36960	N
04/21/98	Atrazine	0.2	9923	N
05/07/98	Atrazine	0.8	3820	N
05/14/98	Atrazine	1.0	3280	N
05/21/98	Atrazine	1.6	1631	N
05/28/98	Atrazine	3.4	1445	N
06/04/98	Atrazine	4.5	1932	N
06/10/98	Atrazine	2.6	1113	N
06/18/98	Atrazine	16	7250	N
06/25/98	Atrazine	15	8764	N
07/01/98	Atrazine	5.2	10210	N
07/09/98	Atrazine	1.8	8672	N
07/16/98	Atrazine	1.0	9987	N
07/22/98	Atrazine	0.4	36960	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
07/30/98	Atrazine	0.6	10500	N
05/28/98	Clomazone	0.1	1445	N
07/01/98	Clomazone	0.3	10210	N
07/09/98	Clomazone	0.2	8672	N
05/28/98	Cyanazine	0.4	1445	N
06/04/98	Cyanazine	0.6	1932	N
06/10/98	Cyanazine	0.4	1113	N
04/21/98	Di(2-ethylhexyl)phthalate	0.8	9923	N
04/28/98	Di(2-ethylhexyl)phthalate	1.2	2546	N
07/09/98	Di(2-ethylhexyl)phthalate	0.7	8672	N
07/22/98	Di(2-ethylhexyl)phthalate	4.9	36960	N
04/28/98	Di-n-butylphthalate	3.2	2546	N
05/07/98	Di-n-butylphthalate	1.6	3820	N

Table IV-14 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/21/98	Metolachlor	0.2	9923	N
04/28/98	Metolachlor	0.3	2546	N
05/07/98	Metolachlor	0.7	3820	N
05/14/98	Metolachlor	1.0	3280	N
05/21/98	Metolachlor	1.3	1631	N
05/28/98	Metolachlor	1.9	1445	N
06/04/98	Metolachlor	2.0	1932	N
06/10/98	Metolachlor	1.0	1113	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/18/98	Metolachlor	13	7250	N
06/25/98	Metolachlor	6.8	8764	N
07/01/98	Metolachlor	5.7	10210	N
07/09/98	Metolachlor	3.6	8672	N
07/16/98	Metolachlor	1.1	9987	N
07/22/98	Metolachlor	1.2	36960	N
07/30/98	Metolachlor	1.0	10500	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-15 Station DC-5, Deer Creek near Delphi

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/22/98	Acetochlor	0.3	237	N
04/29/98	Acetochlor	0.2	198	N
05/15/98	Acetochlor	0.1	260	N
05/22/98	Acetochlor	0.7	185	N
05/27/98	Acetochlor	0.6	151	N
06/03/98	Acetochlor	0.1	223	N
06/12/98	Acetochlor	2.3	2891	N
06/19/98	Acetochlor	0.8	1506	N
06/26/98	Acetochlor	0.1	249	N
07/02/98	Acetochlor	0.2	310	N
07/10/98	Acetochlor	0.1	822	N
07/23/98	Acetochlor	0.1	9994	N
05/27/98	Alachlor	0.1	151	N
06/12/98	Alachlor	2.3	2891	N
06/19/98	Alachlor	0.2	1506	N
04/22/98	Atrazine	0.3	237	N
04/29/98	Atrazine	0.3	198	N
05/15/98	Atrazine	0.6	260	Y
05/15/98	Atrazine	0.8	260	N
05/22/98	Atrazine	2.9	185	N
05/27/98	Atrazine	2.9	151	N
06/03/98	Atrazine	1.3	223	N
06/09/98	Atrazine	0.5	122	N
06/12/98	Atrazine	16	2891	N
06/19/98	Atrazine	3.5	1506	N
06/26/98	Atrazine	2.0	249	N
07/02/98	Atrazine	0.9	310	N
07/10/98	Atrazine	0.7	822	N
07/17/98	Atrazine	0.4	178	N
07/23/98	Atrazine	0.4	9994	N
07/31/98	Atrazine	0.3	209	N
07/17/98	Benzo[a]anthracene	0.1	178	N
07/17/98	Benzo[a]pyrene	0.16	178	N
07/17/98	Benzo[b]fluoranthene	0.2	178	N
07/17/98	Benzo[k]fluoranthene	0.2	178	N
05/27/98	Clomazone	0.4	151	N
06/03/98	Clomazone	0.1	223	N
06/12/98	Clomazone	3.2	2891	N
06/19/98	Clomazone	0.7	1506	N
06/26/98	Clomazone	0.3	249	N
07/02/98	Clomazone	0.3	310	N
07/10/98	Clomazone	0.2	822	N
07/23/98	Clomazone	0.2	9994	N
06/26/98	Cyanazine	0.3	249	N
04/29/98	Di(2-ethylhexyl)phthalate	0.9	198	N
06/19/98	Fluoranthene	0.2	1506	N
07/17/98	Fluoranthene	0.4	178	N

Table IV-15 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/22/98	Metolachlor	0.2	237	N
04/29/98	Metolachlor	0.2	198	N
05/15/98	Metolachlor	0.4	260	Y
05/15/98	Metolachlor	0.5	260	N
05/22/98	Metolachlor	2.6	185	N
05/27/98	Metolachlor	1.9	151	N
06/03/98	Metolachlor	0.7	223	N
06/09/98	Metolachlor	0.3	122	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/12/98	Metolachlor	30	2891	N
06/19/98	Metolachlor	6.4	1506	N
06/26/98	Metolachlor	2.2	249	N
07/02/98	Metolachlor	2.2	310	N
07/10/98	Metolachlor	2.3	822	N
07/17/98	Metolachlor	0.6	178	N
07/23/98	Metolachlor	1.5	9994	N
07/31/98	Metolachlor	0.8	209	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-16 Station TR-159, Tippecanoe River at Oswego

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/18/98	Acetochlor	0.2	74	N
04/21/98	Atrazine	0.5	319	N
05/07/98	Atrazine	0.3	207	N
05/14/98	Atrazine	0.2	166	N
05/21/98	Atrazine	0.3	59	N
05/28/98	Atrazine	0.6	70	N
06/04/98	Atrazine	0.4	47	N
06/10/98	Atrazine	0.6	25	N
06/18/98	Atrazine	0.4	74	N
06/25/98	Atrazine	0.4	81	N
07/01/98	Atrazine	0.5	115	N
07/09/98	Atrazine	0.5	135	N
07/16/98	Atrazine	0.5	69	N
07/22/98	Atrazine	0.5	79	N
07/30/98	Atrazine	0.3	108	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/21/98	Di(2-	1.1	319	N
04/28/98	Di(2-ethylhexyl)phthalate	1.3	195	N
04/21/98	Di-n-butylphthalate	2.8	319	N
04/21/98	Metolachlor	0.2	319	N
04/28/98	Metolachlor	0.1	195	N
05/07/98	Metolachlor	0.1	207	N
05/14/98	Metolachlor	0.1	166	N
05/21/98	Metolachlor	0.2	59	N
05/28/98	Metolachlor	0.2	70	N
06/04/98	Metolachlor	0.2	47	N
06/10/98	Metolachlor	0.2	25	N
06/18/98	Metolachlor	0.5	74	N
06/25/98	Metolachlor	0.2	81	N
07/01/98	Metolachlor	0.3	115	N
07/09/98	Metolachlor	0.2	135	N
07/16/98	Metolachlor	0.2	69	N
07/22/98	Metolachlor	0.2	79	N
07/30/98	Metolachlor	0.1	108	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-17 Station TR-79, Tippecanoe River near Ora

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/07/98	Acetochlor	0.2	2466	N
05/21/98	Acetochlor	1.3	1183	N
06/25/98	Acetochlor	0.2	1240	N
07/01/98	Acetochlor	0.1	1050	N
07/09/98	Acetochlor	0.2	2599	N
07/16/98	Acetochlor	1.0	926	N
05/07/98	Alachlor	0.2	2466	N
05/21/98	Alachlor	0.7	1183	N
06/25/98	Alachlor	0.1	1240	N
07/01/98	Alachlor	0.2	1050	N
07/09/98	Alachlor	0.2	2599	N
05/07/98	Atrazine	0.6	2466	N
05/21/98	Atrazine	1.8	1183	N
05/28/98	Atrazine	0.5	886	N
06/04/98	Atrazine	0.3	635	N
06/10/98	Atrazine	0.4	635	N
06/25/98	Atrazine	1.2	1240	N
07/01/98	Atrazine	0.8	1050	N
07/09/98	Atrazine	0.8	2599	N
07/16/98	Atrazine	1.8	926	N
07/22/98	Atrazine	0.3	944	N
07/30/98	Atrazine	0.4	1370	N
07/16/98	Clomazone	0.1	926	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/21/98	Di(2-ethylhexyl)phthalate	1.2	2366	N
07/09/98	Di(2-ethylhexyl)phthalate	0.7	2599	N
04/21/98	Di-n-butylphthalate	2.2	2366	N
05/07/98	Metolachlor	0.4	2466	N
05/14/98	Metolachlor	0.2	1736	N
05/21/98	Metolachlor	0.3	1183	N
05/28/98	Metolachlor	0.2	886	N
06/25/98	Metolachlor	0.4	1240	N
07/01/98	Metolachlor	0.4	1050	N
07/09/98	Metolachlor	0.8	2599	N
07/16/98	Metolachlor	2.9	926	N
07/22/98	Metolachlor	0.1	944	N
07/30/98	Metolachlor	0.2	1370	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-18 Station TR-9, Tippecanoe River near Delphi

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/15/98	Acetochlor	0.4	5023	N
05/22/98	Acetochlor	0.2	900	N
05/27/98	Acetochlor	0.7	1577	N
06/03/98	Acetochlor	0.4	2559	N
06/09/98	Acetochlor	0.2	1725	N
06/12/98	Acetochlor	0.6	8447	Y
06/19/98	Acetochlor	1.6	5544	N
06/26/98	Acetochlor	0.6	2384	N
07/02/98	Acetochlor	0.2	3490	N
07/10/98	Acetochlor	0.3	4591	N
07/31/98	Acetochlor	0.2	1952	N
05/27/98	Alachlor	0.1	1577	N
06/03/98	Alachlor	0.1	2559	N
06/09/98	Alachlor	0.1	1725	N
06/12/98	Alachlor	0.2	8447	Y
06/19/98	Alachlor	0.5	5544	N
06/26/98	Alachlor	0.3	2384	N
07/10/98	Alachlor	0.1	4591	N
04/22/98	Atrazine	0.2	4600	N
05/04/98	Atrazine	0.6	5986	N
05/15/98	Atrazine	1.0	5023	N
05/22/98	Atrazine	0.4	900	N
05/27/98	Atrazine	2.8	1577	N
06/03/98	Atrazine	2.1	2559	N
06/09/98	Atrazine	1.6	1725	N
06/12/98	Atrazine	2.8	8447	Y
06/19/98	Atrazine	8.6	5544	N
06/26/98	Atrazine	5.0	2384	N
07/02/98	Atrazine	1.5	3490	N
07/10/98	Atrazine	1.1	4591	N
07/17/98	Atrazine	0.7	1990	N
07/23/98	Atrazine	0.6	8698	N
07/31/98	Atrazine	0.4	1952	N
06/12/98	Clomazone	0.5	8447	Y
06/19/98	Clomazone	0.3	5544	N
07/02/98	Clomazone	0.2	3490	N
06/26/98	Cyanazine	0.3	2384	N
04/22/98	Di(2-ethylhexyl)phthalate	0.8	4600	N
04/29/98	Di(2-ethylhexyl)phthalate	1.3	1812	N
05/04/98	Di(2-ethylhexyl)phthalate	2.5	5986	N
06/12/98	Di(2-ethylhexyl)phthalate	0.8	8447	Y
04/29/98	Di-n-butylphthalate	2.3	1812	N
05/04/98	Di-n-butylphthalate	1.9	5986	N
05/15/98	Di-n-butylphthalate	1.0	5023	N
07/02/98	Fluoranthene	0.2	3490	N

Table IV-18 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/29/98	Metolachlor	0.1	1812	N
05/04/98	Metolachlor	1.1	5986	N
05/15/98	Metolachlor	0.7	5023	N
05/22/98	Metolachlor	0.2	900	N
05/27/98	Metolachlor	0.7	1577	N
06/03/98	Metolachlor	0.5	2559	N
06/09/98	Metolachlor	0.4	1725	N
06/12/98	Metolachlor	3.1	8447	Y

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/19/98	Metolachlor	4.4	5544	N
06/26/98	Metolachlor	1.6	2384	N
07/02/98	Metolachlor	1.3	3490	N
07/10/98	Metolachlor	1.3	4591	N
07/17/98	Metolachlor	0.5	1990	N
07/23/98	Metolachlor	0.3	8698	N
07/31/98	Metolachlor	0.3	1952	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-19 Station WC-80, Wildcat Creek near Jerome

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/30/98	Acetochlor	0.1	223	N
05/07/98	Acetochlor	0.4	1074	N
05/14/98	Acetochlor	1.0	250	N
05/22/98	Acetochlor	0.4	159	N
05/28/98	Acetochlor	0.1	91	N
06/04/98	Acetochlor	0.2	69	Y
06/04/98	Acetochlor	0.1	69	N
06/12/98	Acetochlor	2.4	6847	N
06/19/98	Acetochlor	1.1	1632	N
06/25/98	Acetochlor	0.5	144	N
07/02/98	Acetochlor	0.2	441	N
07/10/98	Acetochlor	0.2	1159	N
06/12/98	Alachlor	0.4	6847	N
06/19/98	Alachlor	0.5	1632	N
06/25/98	Alachlor	0.2	144	N
07/02/98	Alachlor	0.1	441	N
07/10/98	Alachlor	0.1	1159	N
04/23/98	Atrazine	0.2	182	N
04/30/98	Atrazine	0.2	223	N
05/07/98	Atrazine	0.9	1074	N
05/14/98	Atrazine	2.6	250	N
05/22/98	Atrazine	1.5	159	N
05/28/98	Atrazine	1.1	91	N
06/04/98	Atrazine	1.2	69	Y
06/04/98	Atrazine	1.2	69	N
06/10/98	Atrazine	1.0	56	N
06/12/98	Atrazine	19	6847	N
06/19/98	Atrazine	8.0	1632	N
06/25/98	Atrazine	6.7	144	N
07/02/98	Atrazine	3.9	441	N
07/10/98	Atrazine	2.2	1159	N
07/16/98	Atrazine	1.6	181	N
07/23/98	Atrazine	0.5	5854	N
07/31/98	Atrazine	0.7	179	N
04/23/98	Chlorpyrifos	0.1	182	N
06/12/98	Clomazone	1.6	6847	N
06/19/98	Clomazone	0.9	1632	N
06/25/98	Clomazone	0.5	144	N
07/02/98	Clomazone	0.3	441	N
07/10/98	Clomazone	0.3	1159	N
07/16/98	Clomazone	0.1	181	N
07/23/98	Clomazone	0.1	5854	N
05/14/98	Cyanazine	0.7	250	N
05/22/98	Cyanazine	0.4	159	N
06/04/98	Cyanazine	0.3	69	Y
06/10/98	Cyanazine	0.3	56	N
06/12/98	Cyanazine	3.4	6847	N
06/19/98	Cyanazine	0.6	1632	N
06/25/98	Cyanazine	0.6	144	N
04/23/98	Di(2-ethylhexyl)phthalate	1.6	182	N
05/07/98	Di-n-butylphthalate	1.1	1074	N

Table IV-19 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/07/98	Fluoranthene	0.7	1074	N
05/22/98	Fluoranthene	0.4	159	N
05/28/98	Fluoranthene	0.2	91	N
06/04/98	Fluoranthene	0.1	69	Y
06/04/98	Fluoranthene	0.1	69	N
06/10/98	Fluoranthene	0.1	56	N
07/31/98	Fluoranthene	0.2	179	N
04/23/98	Metolachlor	0.3	182	N
04/30/98	Metolachlor	0.3	223	N
05/07/98	Metolachlor	1.1	1074	N
05/14/98	Metolachlor	1.6	250	N
05/22/98	Metolachlor	0.7	159	N
05/28/98	Metolachlor	0.5	91	N
06/04/98	Metolachlor	0.3	69	Y
06/04/98	Metolachlor	0.3	69	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/10/98	Metolachlor	0.3	56	N
06/12/98	Metolachlor	16	6847	N
06/19/98	Metolachlor	5.5	1632	N
06/25/98	Metolachlor	3.5	144	N
07/02/98	Metolachlor	2.4	441	N
07/10/98	Metolachlor	2.2	1159	N
07/16/98	Metolachlor	1.1	181	N
07/23/98	Metolachlor	0.9	5854	N
07/31/98	Metolachlor	0.8	179	N
04/30/98	Prometon	0.2	223	N
06/04/98	Prometon	0.2	69	N
06/10/98	Prometon	0.3	56	N
05/28/98	Pyrene	0.2	91	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-20 Station WC-60, Wildcat Creek at Kokomo

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/30/98	Acetochlor	0.1	223	N
05/07/98	Acetochlor	0.4	1074	N
05/14/98	Acetochlor	1.0	250	N
05/22/98	Acetochlor	0.4	159	N
05/28/98	Acetochlor	0.1	91	N
06/04/98	Acetochlor	0.2	69	Y
06/04/98	Acetochlor	0.1	69	N
06/10/98	Acetochlor	0.2	56	N
06/12/98	Acetochlor	2.4	6847	N
06/19/98	Acetochlor	1.1	1632	N
06/25/98	Acetochlor	0.5	144	N
07/02/98	Acetochlor	0.2	441	N
07/10/98	Acetochlor	0.2	1159	N
06/12/98	Alachlor	0.4	6847	N
06/19/98	Alachlor	0.5	1632	N
06/25/98	Alachlor	0.2	144	N
07/02/98	Alachlor	0.1	441	N
07/10/98	Alachlor	0.1	1159	N
04/23/98	Atrazine	0.2	182	N
04/30/98	Atrazine	0.2	223	N
05/07/98	Atrazine	0.9	1074	N
05/14/98	Atrazine	2.6	250	N
05/22/98	Atrazine	1.5	159	N
05/28/98	Atrazine	1.1	91	N
06/04/98	Atrazine	1.2	69	Y
06/04/98	Atrazine	1.2	69	N
06/10/98	Atrazine	1.0	56	N
06/12/98	Atrazine	19	6847	N
06/19/98	Atrazine	8.0	1632	N
06/25/98	Atrazine	6.7	144	N
07/02/98	Atrazine	3.9	441	N
07/10/98	Atrazine	2.2	1159	N
07/16/98	Atrazine	1.6	181	N
07/23/98	Atrazine	0.5	5854	N
07/31/98	Atrazine	0.7	179	N
04/23/98	Chlorpyrifos	0.1	182	N
06/12/98	Clomazone	1.6	6847	N
06/19/98	Clomazone	0.9	1632	N
06/25/98	Clomazone	0.5	144	N
07/02/98	Clomazone	0.3	441	N
07/10/98	Clomazone	0.3	1159	N
07/16/98	Clomazone	0.1	181	N
07/23/98	Clomazone	0.1	5854	N
05/14/98	Cyanazine	0.7	250	N
05/22/98	Cyanazine	0.4	159	N
06/04/98	Cyanazine	0.3	69	Y
06/10/98	Cyanazine	0.3	56	N
06/12/98	Cyanazine	3.4	6847	N
06/19/98	Cyanazine	0.6	1632	N
06/25/98	Cyanazine	0.6	144	N
04/23/98	Di(2-ethylhexyl)phthalate	1.6	182	N
05/07/98	Di-n-butylphthalate	1.1	1074	N

Table IV-20 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/07/98	Fluoranthene	0.7	1074	N
05/22/98	Fluoranthene	0.4	159	N
05/28/98	Fluoranthene	0.2	91	N
06/04/98	Fluoranthene	0.1	69	Y
06/04/98	Fluoranthene	0.1	69	N
06/10/98	Fluoranthene	0.1	56	N
07/31/98	Fluoranthene	0.2	179	N
04/23/98	Metolachlor	0.3	182	N
04/30/98	Metolachlor	0.3	223	N
05/07/98	Metolachlor	1.1	1074	N
05/14/98	Metolachlor	1.6	250	N
05/22/98	Metolachlor	0.7	159	N
05/28/98	Metolachlor	0.5	91	N
06/04/98	Metolachlor	0.3	69	Y
06/04/98	Metolachlor	0.3	69	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/10/98	Metolachlor	0.3	56	N
06/12/98	Metolachlor	16	6847	N
06/19/98	Metolachlor	5.5	1632	N
06/25/98	Metolachlor	3.5	144	N
07/02/98	Metolachlor	2.4	441	N
07/10/98	Metolachlor	2.2	1159	N
07/16/98	Metolachlor	1.1	181	N
07/23/98	Metolachlor	0.9	5854	N
07/31/98	Metolachlor	0.8	179	N
04/30/98	Prometon	0.2	223	N
06/04/98	Prometon	0.2	69	N
06/10/98	Prometon	0.3	56	N
05/28/98	Pyrene	0.2	91	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-21 Station WC-15, Wildcat Creek at Owasco

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
07/10/98	Acetochlor	0.1	2199	N
06/03/98	Acetochlor	0.1	166	N
07/17/98	Acetochlor	0.2	259	N
05/04/98	Acetochlor	0.2	1010	N
05/22/98	Acetochlor	0.3	226	N
05/27/98	Acetochlor	0.3	242	N
07/02/98	Acetochlor	0.4	628	N
05/15/98	Acetochlor	0.6	375	N
06/19/98	Acetochlor	1.3	1878	N
06/12/98	Acetochlor	3.7	4172	N
07/02/98	Alachlor	0.2	628	N
06/19/98	Alachlor	0.5	1878	N
06/12/98	Alachlor	1.2	4172	N
04/22/98	Atrazine	0.2	3623	N
04/29/98	Atrazine	0.2	259	N
07/31/98	Atrazine	0.4	329	N
05/04/98	Atrazine	0.4	1010	N
07/23/98	Atrazine	0.7	3219	Y
06/09/98	Atrazine	0.7	142	N
07/23/98	Atrazine	0.7	3219	N
06/03/98	Atrazine	0.9	166	N
07/17/98	Atrazine	1.1	259	N
07/10/98	Atrazine	1.3	2199	N
05/22/98	Atrazine	1.4	226	N
05/27/98	Atrazine	1.8	242	N
06/12/98	Atrazine	14	4172	N
05/15/98	Atrazine	2.0	375	N
07/02/98	Atrazine	5.3	628	N
06/19/98	Atrazine	9.0	1878	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
07/17/98	Clomazone	0.1	259	N
07/10/98	Clomazone	0.2	2199	N
07/02/98	Clomazone	0.4	628	N
06/19/98	Clomazone	0.8	1878	N
06/12/98	Clomazone	1.7	4172	N
06/03/98	Cyanazine	0.2	166	N
06/09/98	Cyanazine	0.2	142	N
06/19/98	Cyanazine	0.5	1878	N
05/15/98	Cyanazine	0.6	375	N
04/29/98	Di(2-ethylhexyl)phthalate	0.6	259	N
07/17/98	Di(2-ethylhexyl)phthalate	0.6	259	N
04/22/98	Di-n-butylphthalate	1.3	3623	N

TableIV-21 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/29/98	Metolachlor	0.2	259	N
06/09/98	Metolachlor	0.2	142	N
04/22/98	Metolachlor	0.2	3623	N
06/03/98	Metolachlor	0.3	166	N
07/31/98	Metolachlor	0.5	329	N
05/04/98	Metolachlor	0.6	1010	N
05/27/98	Metolachlor	0.7	242	N
07/23/98	Metolachlor	0.7	3219	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/22/98	Metolachlor	0.7	226	N
07/23/98	Metolachlor	0.8	3219	Y
07/17/98	Metolachlor	1.0	259	N
05/15/98	Metolachlor	1.3	375	N
07/10/98	Metolachlor	1.5	2199	N
06/12/98	Metolachlor	11	4172	N
07/02/98	Metolachlor	3.2	628	N
06/19/98	Metolachlor	5.6	1878	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-22 Station WCS-4, South Fork Wildcat Creek near Lafayette

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/15/98	Acetochlor	0.3	270	N
05/22/98	Acetochlor	1.7	22	N
05/27/98	Acetochlor	1.1	368	N
06/03/98	Acetochlor	0.2	168	N
06/12/98	Acetochlor	3.7	10140	N
06/19/98	Acetochlor	0.9	1689	N
06/26/98	Acetochlor	0.3	36	N
07/02/98	Acetochlor	0.3	368	N
07/10/98	Acetochlor	0.2	459	N
06/12/98	Alachlor	0.1	10140	N
06/19/98	Alachlor	0.1	1689	N
04/29/98	Atrazine	0.3	162	N
05/15/98	Atrazine	1.4	270	N
05/22/98	Atrazine	5.5	22	N
05/27/98	Atrazine	4.1	368	N
06/03/98	Atrazine	1.7	168	N
06/09/98	Atrazine	0.6	174	N
06/12/98	Atrazine	15	10140	N
06/19/98	Atrazine	5.0	1689	N
06/26/98	Atrazine	2.6	36	N
07/02/98	Atrazine	1.5	368	N
07/10/98	Atrazine	0.9	459	N
07/17/98	Atrazine	0.4	142	N
07/23/98	Atrazine	0.7	1627	N
05/22/98	Clomazone	0.5	22	N
05/27/98	Clomazone	0.3	368	N
06/12/98	Clomazone	2.6	10140	N
06/19/98	Clomazone	0.7	1989	N
06/26/98	Clomazone	0.3	36	N
07/02/98	Clomazone	0.3	368	N
07/10/98	Clomazone	0.2	459	N
07/23/98	Clomazone	0.2	1627	N
04/22/98	Di(2-ethylhexyl)phthalate	0.6	22	N
05/15/98	Di(2-ethylhexyl)phthalate	0.7	270	N
06/12/98	Di(2-ethylhexyl)phthalate	1.8	10140	N
04/22/98	Di-n-butylphthalate	1.7	22	N
04/29/98	Di-n-butylphthalate	1.7	162	N
06/12/98	Di-n-butylphthalate	1.7	10140	N
04/22/98	Metolachlor	0.1	22	N
04/29/98	Metolachlor	0.5	162	N
05/15/98	Metolachlor	0.9	270	N
05/22/98	Metolachlor	6.7	22	N
05/27/98	Metolachlor	3.0	368	N
06/03/98	Metolachlor	0.6	168	N
06/09/98	Metolachlor	0.3	174	N
06/12/98	Metolachlor	15	10140	N
06/19/98	Metolachlor	3.9	1689	N
06/26/98	Metolachlor	1.9	36	N
07/02/98	Metolachlor	1.4	368	N
07/10/98	Metolachlor	1.0	459	N
07/17/98	Metolachlor	0.4	142	N
07/23/98	Metolachlor	1.1	1627	N
07/31/98	Metolachlor	0.3	126	N
06/12/98	Pendimethalin	0.2	10140	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-23 Station WC-5, Wildcat Creek near Lafayette

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/29/98	Acetochlor	0.2	581	N
05/15/98	Acetochlor	0.6	1000	N
05/22/98	Acetochlor	1.2	506	N
05/27/98	Acetochlor	1.3	952	N
06/03/98	Acetochlor	0.1	516	N
06/12/98	Acetochlor	5.0	16750	N
06/19/98	Acetochlor	1.4	4902	Y
06/19/98	Acetochlor	1.4	4902	N
06/26/98	Acetochlor	0.4	1264	Y
06/26/98	Acetochlor	0.4	1264	N
07/02/98	Acetochlor	1.2	1421	N
07/10/98	Acetochlor	0.1	4344	N
07/23/98	Acetochlor	0.2	5701	N
05/27/98	Alachlor	0.1	952	N
06/12/98	Alachlor	0.5	16750	N
06/19/98	Alachlor	0.2	4902	N
06/19/98	Alachlor	0.3	4902	Y
06/26/98	Alachlor	0.1	1264	N
06/26/98	Alachlor	0.1	1264	Y
07/02/98	Alachlor	0.1	1421	N
04/22/98	Atrazine	0.1	852	N
04/29/98	Atrazine	0.2	581	N
05/15/98	Atrazine	1.7	1000	N
05/22/98	Atrazine	2.7	506	N
05/27/98	Atrazine	4.4	952	N
06/03/98	Atrazine	1.2	516	N
06/09/98	Atrazine	0.7	464	N
06/12/98	Atrazine	15	16750	N
06/19/98	Atrazine	6.6	4902	Y
06/19/98	Atrazine	7.6	4902	N
06/26/98	Atrazine	4.2	1264	N
06/26/98	Atrazine	3.9	1264	Y
07/02/98	Atrazine	2.7	1421	N
07/10/98	Atrazine	1.2	4344	N
07/17/98	Atrazine	0.7	642	N
07/23/98	Atrazine	0.8	5701	N
05/22/98	Clomazone	0.2	506	N
05/27/98	Clomazone	0.3	952	N
06/12/98	Clomazone	2.8	16750	N
06/19/98	Clomazone	0.8	4902	Y
06/19/98	Clomazone	0.9	4902	N
06/26/98	Clomazone	0.4	1264	N
06/26/98	Clomazone	0.4	1264	Y
07/02/98	Clomazone	0.2	1421	N
07/10/98	Clomazone	0.2	4344	N
07/23/98	Clomazone	0.2	5701	N
06/26/98	Cyanazine	0.3	1264	N
06/12/98	Di(2-ethylhexyl)phthalate	1.5	16750	N
06/26/98	Di(2-ethylhexyl)phthalate	0.8	1264	Y
06/26/98	Di(2-ethylhexyl)phthalate	0.6	1264	N
06/09/98	Di-n-butylphthalate	1.0	464	N
07/23/98	Di-n-butylphthalate	1.0	5701	N
06/19/98	Fluoranthene	0.2	4902	Y
06/26/98	Fluoranthene	0.1	1264	N

Table IV-23 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/22/98	Metolachlor	0.1	852	N
04/29/98	Metolachlor	0.2	581	N
05/15/98	Metolachlor	1.1	1000	N
05/22/98	Metolachlor	2.1	506	N
05/27/98	Metolachlor	2.9	952	N
06/03/98	Metolachlor	0.5	516	N
06/09/98	Metolachlor	0.3	464	N
06/12/98	Metolachlor	14	16750	N
06/19/98	Metolachlor	6.0	4902	N
06/19/98	Metolachlor	5.9	4902	Y
06/26/98	Metolachlor	2.6	1264	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/26/98	Metolachlor	2.6	1264	Y
07/02/98	Metolachlor	2.9	1421	N
07/10/98	Metolachlor	1.3	4344	N
07/17/98	Metolachlor	0.8	642	N
07/23/98	Metolachlor	1.1	5701	N
07/31/98	Metolachlor	0.5	540	N
06/12/98	Pendimethalin	0.1	16750	N
07/23/98	Prometryn	0.2	5701	N

Appendix IV Herbicide Concentrations and Stream Flow

Table IV-24 Station WB-311, Wabash River at Lafayette

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
05/04/98	Acetochlor	0.8	13770	N
05/15/98	Acetochlor	0.4	5190	N
05/22/98	Acetochlor	0.7	4224	N
05/27/98	Acetochlor	0.6	440	N
06/03/98	Acetochlor	0.6	4140	N
06/09/98	Acetochlor	0.2	3148	N
06/12/98	Acetochlor	3.2	32570	N
06/19/98	Acetochlor	2.3	21940	N
06/26/98	Acetochlor	1.6	13170	N
07/02/98	Acetochlor	0.3	15410	N
07/10/98	Acetochlor	0.6	20540	Y
07/10/98	Acetochlor	0.6	20540	N
07/17/98	Acetochlor	0.5	12120	N
07/17/98	Acetochlor	0.6	12120	Y
07/23/98	Acetochlor	0.1	40710	N
07/31/98	Acetochlor	0.2	13560	N
05/27/98	Alachlor	0.1	440	N
06/03/98	Alachlor	0.2	4140	N
06/12/98	Alachlor	0.6	32570	N
06/19/98	Alachlor	0.3	21940	N
06/26/98	Alachlor	0.2	13170	N
07/02/98	Alachlor	0.2	15410	N
07/10/98	Alachlor	0.1	20540	N
07/10/98	Alachlor	0.1	20540	Y
04/22/98	Atrazine	0.2	15520	N
04/29/98	Atrazine	0.2	5586	N
05/04/98	Atrazine	2.1	13770	N
05/15/98	Atrazine	0.7	5190	N
05/22/98	Atrazine	1.0	4224	N
05/27/98	Atrazine	2.5	440	N
06/03/98	Atrazine	3.8	4140	N
06/09/98	Atrazine	1.3	3148	N
06/12/98	Atrazine	12	32570	N
06/19/98	Atrazine	9.7	21940	N
06/26/98	Atrazine	10	13170	N
07/02/98	Atrazine	1.9	15410	N
07/10/98	Atrazine	1.4	20540	Y
07/10/98	Atrazine	1.5	20540	N
07/17/98	Atrazine	1.3	12120	N
07/17/98	Atrazine	1.3	12120	Y
07/23/98	Atrazine	0.7	40710	N
07/31/98	Atrazine	0.3	13560	N
05/22/98	Carboxin	0.2	4224	N
06/12/98	Clomazone	1.6	32570	N
06/19/98	Clomazone	0.4	21940	N
07/02/98	Clomazone	0.3	15410	N
07/10/98	Clomazone	0.1	20540	Y
07/17/98	Clomazone	0.1	12120	N
06/12/98	Cyanazine	0.4	32570	N
06/26/98	Cyanazine	0.9	13170	N
04/29/98	Di(2-ethylhexyl)phthalate	1.0	5586	N
06/12/98	Di(2-ethylhexyl)phthalate	0.9	32570	N
06/26/98	Di(2-ethylhexyl)phthalate	0.6	13170	N
04/29/98	Di-n-butylphthalate	2.5	5586	N

Table IV-24 Continued

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
04/22/98	Fluoranthene	0.3	15520	N
04/22/98	Metolachlor	0.2	15520	N
04/29/98	Metolachlor	0.2	5586	N
05/04/98	Metolachlor	1.7	13770	N
05/15/98	Metolachlor	0.5	5190	N
05/22/98	Metolachlor	0.7	4224	N
05/27/98	Metolachlor	1.0	440	N
06/03/98	Metolachlor	1.0	4140	N
06/09/98	Metolachlor	0.4	3148	N
06/12/98	Metolachlor	14	32570	N

DATE	COMPOUND	RESULT (ug/L)	FLOW (cfs)	DUPLICATE (Y/N)
06/19/98	Metolachlor	6.2	21940	N
06/26/98	Metolachlor	4.6	13170	N
07/02/98	Metolachlor	2.0	15410	N
07/10/98	Metolachlor	2.1	20540	N
07/10/98	Metolachlor	2.0	20540	Y
07/17/98	Metolachlor	1.8	12120	N
07/17/98	Metolachlor	1.8	12120	Y
07/23/98	Metolachlor	0.9	40710	N
07/31/98	Metolachlor	0.8	13560	N
07/31/98	Metolachlor	0.3	13560	Y

APPENDIX V

Descriptive Statistics

Appendix V
List of Tables

Appendix V Descriptive Statistics

Table V-1 Station WB, Wabash River at Linn Grove

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Quartile	Lower Quartile	Upper Quartile	Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	0.687	0.217	1.157	0.300	0.000	2.400	0.000	1.400	2.400	1.400	0.720	0.848
ATRAZINE	15	3.560	1.660	5.460	2.100	0.500	10.000	0.700	6.700	9.500	6.000	11.771	3.431
METOLACHLOR	15	2.573	1.471	3.675	2.000	0.400	7.700	1.000	2.900	7.300	1.900	3.959	1.990
April													
ACETOCHLOR	2	0.250	-2.927	3.427	0.250	0.000	0.500	n/a	n/a	0.500	n/a	0.125	0.354
ATRAZINE	2	1.100	-6.524	8.724	1.100	0.500	1.700	n/a	n/a	1.200	n/a	0.720	0.849
METOLACHLOR	2	2.300	-4.053	8.653	2.300	1.800	2.800	n/a	n/a	1.000	n/a	0.500	0.707
May													
ACETOCHLOR	4	0.650	-0.678	1.978	0.250	0.200	1.900	0.200	1.100	1.700	0.900	0.697	0.835
ATRAZINE	4	2.500	-3.230	8.230	0.750	0.600	7.900	0.650	4.350	7.300	3.700	12.967	3.601
METOLACHLOR	4	1.825	-0.393	4.043	1.800	0.400	3.300	0.650	3.000	2.900	2.350	1.943	1.394
June													
ACETOCHLOR	5	1.400	0.276	2.524	1.400	0.400	2.400	0.600	2.200	2.000	1.600	0.820	0.906
ATRAZINE	5	6.860	3.000	10.720	6.700	3.500	10.000	4.100	10.000	6.500	5.900	9.663	3.109
METOLACHLOR	5	4.120	0.856	7.384	2.900	1.900	7.700	2.000	6.100	5.800	4.100	6.912	2.629
July													
ACETOCHLOR	4	0.050	-0.109	0.209	0.000	0.000	0.200	0.000	0.100	0.200	0.100	0.010	0.100
ATRAZINE	4	1.725	0.423	3.027	1.900	0.600	2.500	1.150	2.300	1.900	1.150	0.669	0.818
METOLACHLOR	4	1.525	0.013	3.037	1.200	0.800	2.900	0.900	2.150	2.100	1.250	0.903	0.950

Appendix V Descriptive Statistics

Table V-2 Station WB-409, Wabash River at Huntington

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	1.193	0.368	2.019	1.000	0.000	5.800	0.200	1.900	5.800	1.700	2.221	1.490
ATRAZINE	15	4.540	1.388	7.692	2.900	0.200	21.000	0.800	5.700	20.800	4.900	32.405	5.693
METOLACHLOR	15	2.840	1.309	4.371	2.100	0.300	11.000	1.100	3.300	10.700	2.200	7.638	2.764
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.250	-0.385	0.885	0.250	0.200	0.300	n/a	n/a	0.100	n/a	0.005	0.071
METOLACHLOR	2	0.300	n/a	n/a	0.300	0.300	0.300	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	1.350	0.156	2.544	1.500	0.400	2.000	0.750	1.950	1.600	1.200	0.563	0.751
ATRAZINE	4	2.750	-0.747	6.247	2.350	0.600	5.700	1.150	4.350	5.100	3.200	4.830	2.198
METOLACHLOR	4	2.275	0.418	4.132	2.550	0.700	3.300	1.400	3.150	2.600	1.750	1.363	1.167
June													
ACETOCHLOR	5	2.280	-0.288	4.848	1.100	1.000	5.800	1.000	2.500	4.800	1.500	4.277	2.068
ATRAZINE	5	10.060	1.292	18.828	7.500	3.900	21.000	4.900	13.000	17.100	8.100	49.863	7.061
METOLACHLOR	5	5.120	0.432	9.808	3.600	2.100	11.000	2.200	6.700	8.900	4.500	14.257	3.776
July													
ACETOCHLOR	4	0.275	0.036	0.514	0.200	0.200	0.500	0.200	0.350	0.300	0.150	0.022	0.150
ATRAZINE	4	1.575	0.097	3.053	1.300	0.800	2.900	0.950	2.200	2.100	1.250	0.862	0.929
METOLACHLOR	4	1.825	0.690	2.960	1.700	1.100	2.800	1.350	2.300	1.700	0.950	0.509	0.714

Appendix V Descriptive Statistics

Table V-3 Station LR-8, Little River near Huntington

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	13	0.262	-0.078	0.601	0.100	0.000	2.100	0.000	0.200	2.100	0.200	0.316	0.562
ATRAZINE	13	1.162	-0.087	2.410	0.500	0.000	7.900	0.500	0.700	7.900	0.200	4.271	2.067
METOLACHLOR	13	0.862	0.064	1.659	0.400	0.100	5.100	0.300	0.600	5.000	0.300	1.741	1.319
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.050	-0.585	0.685	0.050	0.000	0.100	n/a	n/a	0.100	n/a	0.005	0.071
METOLACHLOR	2	0.150	-0.485	0.785	0.150	0.100	0.200	n/a	n/a	0.100	n/a	0.005	0.071
May													
ACETOCHLOR	3	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	3	0.567	0.280	0.854	0.500	0.500	0.700	n/a	n/a	0.200	n/a	0.013	0.115
METOLACHLOR	3	0.467	0.180	0.754	0.400	0.400	0.600	n/a	n/a	0.200	n/a	0.013	0.115
June													
ACETOCHLOR	4	0.625	-0.952	2.202	0.200	0.000	2.100	0.050	1.200	2.100	1.150	0.983	0.991
ATRAZINE	4	2.625	-3.031	8.281	1.050	0.500	7.900	0.500	4.750	7.400	4.250	12.636	3.555
METOLACHLOR	4	1.675	-2.014	5.364	0.700	0.200	5.100	0.250	3.100	4.900	2.850	5.376	2.319
July													
ACETOCHLOR	4	0.075	-0.077	0.227	0.050	0.000	0.200	0.000	0.150	0.200	0.150	0.009	0.096
ATRAZINE	4	0.700	0.149	1.251	0.600	0.400	1.200	0.500	0.900	0.800	0.400	0.120	0.346
METOLACHLOR	4	0.700	0.050	1.350	0.550	0.400	1.300	0.450	0.950	0.900	0.500	0.167	0.408

Appendix V Descriptive Statistics

Table V-4 Station S-30, Salamonie River near Warren

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	1.253	0.407	2.100	0.600	0.000	5.100	0.100	2.000	5.100	1.900	2.336	1.528
ATRAZINE	15	5.020	1.858	8.182	2.700	0.000	17.000	0.700	7.500	17.000	6.800	32.593	5.709
METOLACHLOR	15	1.673	0.861	2.485	1.300	0.100	4.500	0.400	2.600	4.400	2.200	2.149	1.466
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	1.700	-18.630	22.030	1.700	0.100	3.300	n/a	n/a	3.200	n/a	5.120	2.263
May													
ACETOCHLOR	4	0.800	-0.499	2.099	0.500	0.200	2.000	0.300	1.300	1.800	1.000	0.667	0.816
ATRAZINE	4	2.525	-2.661	7.711	1.050	0.600	7.400	0.750	4.300	6.800	3.550	10.623	3.259
METOLACHLOR	4	0.825	-0.088	1.738	0.750	0.300	1.500	0.350	1.300	1.200	0.950	0.329	0.574
June													
ACETOCHLOR	5	2.780	0.679	4.881	2.600	0.600	5.100	2.000	3.600	4.500	1.600	2.862	1.692
ATRAZINE	5	11.280	4.673	17.887	8.900	6.000	17.000	7.500	17.000	11.000	9.500	28.317	5.321
METOLACHLOR	5	3.040	1.281	4.799	2.600	1.300	4.500	2.300	4.500	3.200	2.200	2.008	1.417
July													
ACETOCHLOR	4	0.425	-0.440	1.290	0.250	0.000	1.200	0.050	0.800	1.200	0.750	0.296	0.544
ATRAZINE	4	2.200	-0.418	4.818	1.900	0.700	4.300	0.900	3.500	3.600	2.600	2.707	1.645
METOLACHLOR	4	0.800	0.042	1.558	0.800	0.300	1.300	0.400	1.200	1.000	0.800	0.227	0.476

Appendix V Descriptive Statistics

Table V-5 Station S-3, Salamonie River at Dora

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	1.587	0.942	2.231	1.600	0.000	4.400	0.700	2.100	4.400	1.400	1.354	1.164
ATRAZINE	15	2.900	1.517	4.283	2.100	0.000	9.100	1.200	4.900	9.100	3.700	6.233	2.497
METOLACHLOR	15	1.880	1.106	2.654	1.900	0.200	5.800	0.800	2.600	5.600	1.800	1.952	1.397
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.100	-1.171	1.371	0.100	0.000	0.200	n/a	n/a	0.200	n/a	0.020	0.141
METOLACHLOR	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	1.250	0.056	2.444	1.250	0.400	2.100	0.650	1.850	1.700	1.200	0.563	0.751
ATRAZINE	4	2.125	-0.657	4.907	1.750	0.500	4.500	0.850	3.400	4.000	2.550	3.056	1.748
METOLACHLOR	4	1.050	-0.025	2.125	1.000	0.300	1.900	0.550	1.550	1.600	1.000	0.457	0.676
June													
ACETOCHLOR	5	2.740	1.547	3.933	2.400	2.100	4.400	2.100	2.700	2.300	0.600	0.923	0.961
ATRAZINE	5	5.520	2.700	8.340	5.400	2.800	9.100	4.900	5.400	6.300	0.500	5.157	2.271
METOLACHLOR	5	2.900	0.833	4.967	2.100	1.800	5.800	2.000	2.800	4.000	0.800	2.770	1.664
July													
ACETOCHLOR	4	1.275	0.335	2.215	1.200	0.700	2.000	0.800	1.750	1.300	0.950	0.349	0.591
ATRAZINE	4	1.800	1.389	2.211	1.800	1.500	2.100	1.600	2.000	0.600	0.400	0.067	0.258
METOLACHLOR	4	2.275	1.536	3.014	2.350	1.700	2.700	1.900	2.650	1.000	0.750	0.216	0.465

Appendix V Descriptive Statistics

Table V-6 Station WB-387, Wabash River at Wabash

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	15	1.427	0.594	2.259	1.100	0.000	5.200	0.200	2.400	5.200	2.200	2.259	1.503
ATRAZINE	15	3.553	0.949	6.157	2.700	0.100	18.000	0.700	3.600	17.900	2.900	22.110	4.702
METOLACHLOR	15	2.460	0.991	3.929	1.500	0.200	10.000	0.600	4.100	9.800	3.500	7.040	2.653
April													
ACETOCHLOR	2	0.000			0.000	0.000	0.000			0.000		0.000	0.000
ATRAZINE	2	0.150	-0.485	0.785	0.150	0.100	0.200			0.100		0.005	0.071
METOLACHLOR	2	0.200			0.200	0.200	0.200			0.000		0.000	0.000
May													
ACETOCHLOR	4	0.925	-0.364	2.214	0.700	0.300	2.000	0.300	1.550	1.700	1.250	0.656	0.810
ATRAZINE	4	1.800	-0.339	3.939	1.700	0.600	3.200	0.650	2.950	2.600	2.300	1.807	1.344
METOLACHLOR	4	1.125	0.035	2.215	1.050	0.500	1.900	0.550	1.700	1.400	1.150	0.469	0.685
June													
ACETOCHLOR	4	2.475	-0.641	5.591	1.850	1.000	5.200	1.050	3.900	4.200	2.850	3.836	1.959
ATRAZINE	4	8.875	-1.882	19.632	6.950	3.600	18.000	3.750	14.000	14.400	10.250	45.703	6.760
METOLACHLOR	4	4.325	-1.982	10.632	2.900	1.500	10.000	1.600	7.050	8.500	5.450	15.709	3.963
July													
ACETOCHLOR	5	1.560	-0.260	3.380	1.400	0.200	3.600	0.200	2.400	3.400	2.200	2.148	1.466
ATRAZINE	5	2.060	0.404	3.716	2.000	0.700	3.600	0.800	3.200	2.900	2.400	1.778	1.333
METOLACHLOR	5	2.940	0.335	5.545	2.700	0.700	5.600	1.200	4.500	4.900	3.300	4.403	2.098

Appendix V Descriptive Statistics

Table V-7 Station MS-100, Mississinewa River near Ridgeville

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	14	1.629	-0.610	3.867	0.200	0.000	14.000	0.000	0.800	14.000	0.800	15.036	3.878
ATRAZINE	14	6.786	-0.028	13.599	1.500	0.100	36.000	0.500	6.800	35.900	6.300	139.258	11.801
METOLACHLOR	14	7.557	-0.294	15.409	1.150	0.200	41.000	0.500	6.400	40.800	5.900	184.921	13.599
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.250	-0.385	0.885	0.250	0.200	0.300	n/a	n/a	0.100	n/a	0.005	0.071
METOLACHLOR	2	0.300	-0.971	1.571	0.300	0.200	0.400	n/a	n/a	0.200	n/a	0.020	0.141
May													
ACETOCHLOR	3	4.767	-15.098	24.631	0.200	0.100	14.000	n/a	n/a	13.900	n/a	63.943	7.996
ATRAZINE	3	11.367	-33.036	55.770	1.500	0.600	32.000	n/a	n/a	31.400	n/a	319.503	17.875
METOLACHLOR	3	12.767	-39.371	64.904	0.900	0.400	37.000	n/a	n/a	36.600	n/a	440.503	20.988
June													
ACETOCHLOR	5	1.660	-1.300	4.620	0.800	0.300	5.900	0.400	0.900	5.600	0.500	5.683	2.384
ATRAZINE	5	11.540	-5.570	28.650	6.800	3.100	36.000	4.500	7.300	32.900	2.800	189.883	13.780
METOLACHLOR	5	12.760	-7.032	32.552	6.400	2.100	41.000	6.200	8.100	38.900	1.900	254.083	15.940
July													
ACETOCHLOR	4	0.050	-0.109	0.209	0.000	0.000	0.200	0.000	0.100	0.200	0.100	0.010	0.100
ATRAZINE	4	0.675	-0.265	1.615	0.550	0.100	1.500	0.300	1.050	1.400	0.750	0.349	0.591
METOLACHLOR	4	0.775	0.108	1.442	0.600	0.500	1.400	0.550	1.000	0.900	0.450	0.176	0.419

Appendix V Descriptive Statistics

Table V-8 Station MS-8, Mississinewa River at Marion

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	0.607	0.044	1.169	0.200	0.000	3.900	0.000	0.700	3.900	0.700	1.032	1.016
ATRAZINE	15	4.113	0.660	7.567	1.300	0.100	23.000	0.800	5.700	22.900	4.900	38.886	6.236
METOLACHLOR	15	1.660	0.507	2.813	0.800	0.200	6.700	0.400	1.900	6.500	1.500	4.333	2.081
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.150	-0.485	0.785	0.150	0.100	0.200	n/a	n/a	0.100	n/a	0.005	0.071
METOLACHLOR	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	0.500	-0.066	1.066	0.400	0.200	1.000	0.250	0.750	0.800	0.500	0.127	0.356
ATRAZINE	4	1.925	-0.622	4.472	1.300	0.800	4.300	1.050	2.800	3.500	1.750	2.562	1.601
METOLACHLOR	4	1.000	-0.319	2.319	0.750	0.300	2.200	0.500	1.500	1.900	1.000	0.687	0.829
June													
ACETOCHLOR	5	1.380	-0.485	3.245	0.700	0.200	3.900	0.500	1.600	3.700	1.100	2.257	1.502
ATRAZINE	5	9.960	-0.319	20.239	5.900	2.200	23.000	5.700	13.000	20.800	7.300	68.533	8.278
METOLACHLOR	5	3.540	0.092	6.988	1.900	0.900	6.700	1.800	6.400	5.800	4.600	7.713	2.777
July													
ACETOCHLOR	4	0.050	-0.109	0.209	0.000	0.000	0.200	0.000	0.100	0.200	0.100	0.010	0.100
ATRAZINE	4	0.975	-0.218	2.168	0.850	0.200	2.000	0.500	1.450	1.800	0.950	0.563	0.750
METOLACHLOR	4	0.700	0.134	1.266	0.600	0.400	1.200	0.450	0.950	0.800	0.500	0.127	0.356

Appendix V Descriptive Statistics

Table V-9 Station MS-7, Mississinewa River at Peoria

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	0.673	0.270	1.076	0.400	0.000	2.500	0.200	0.900	2.500	0.700	0.529	0.727
ATRAZINE	15	4.167	1.381	6.952	1.600	0.000	17.000	0.700	6.500	17.000	5.800	25.297	5.030
METOLACHLOR	15	2.107	1.014	3.199	1.500	0.300	7.000	0.600	2.700	6.700	2.100	3.891	1.972
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.250	-0.385	0.885	0.250	0.200	0.300	n/a	n/a	0.100	n/a	0.005	0.071
METOLACHLOR	2	0.300	n/a	n/a	0.300	0.300	0.300	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	0.225	-0.047	0.497	0.250	0.000	0.400	0.100	0.350	0.400	0.250	0.029	0.171
ATRAZINE	4	1.225	-0.677	3.127	1.050	0.000	2.800	0.350	2.100	2.800	1.750	1.429	1.195
METOLACHLOR	4	0.775	0.282	1.268	0.700	0.500	1.200	0.550	1.000	0.700	0.450	0.096	0.310
June													
ACETOCHLOR	4	1.350	-0.064	2.764	1.150	0.600	2.500	0.650	2.050	1.900	1.400	0.790	0.889
ATRAZINE	4	8.750	-0.757	18.257	6.850	4.300	17.000	4.350	13.150	12.700	8.800	35.697	5.975
METOLACHLOR	4	3.125	-1.035	7.285	2.000	1.500	7.000	1.550	4.700	5.500	3.150	6.836	2.615
July													
ACETOCHLOR	5	0.760	0.033	1.487	0.600	0.200	1.700	0.400	0.900	1.500	0.500	0.343	0.586
ATRAZINE	5	4.420	-1.571	10.411	1.600	1.000	12.000	1.000	6.500	11.000	5.500	23.282	4.825
METOLACHLOR	5	3.080	1.005	5.155	2.700	1.200	5.500	2.100	3.900	4.300	1.800	2.792	1.671

Appendix V Descriptive Statistics

Table V-10 Station WB-370, Wabash River at Peru

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	1.313	0.489	2.138	0.800	0.000	5.200	0.200	1.800	5.200	1.600	2.217	1.489
ATRAZINE	15	3.727	1.243	6.210	1.800	0.200	15.000	0.700	4.100	14.800	3.400	20.115	4.485
METOLACHLOR	15	2.740	1.056	4.424	1.400	0.200	11.000	1.000	3.400	10.800	2.400	9.250	3.041
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	0.725	0.199	1.251	0.750	0.300	1.100	0.500	0.950	0.800	0.450	0.109	0.330
ATRAZINE	4	1.725	0.483	2.967	1.800	0.700	2.600	1.250	2.200	1.900	0.950	0.609	0.780
METOLACHLOR	4	1.150	0.354	1.946	1.100	0.600	1.800	0.800	1.500	1.200	0.700	0.250	0.500
June													
ACETOCHLOR	4	2.425	-0.824	5.674	1.900	0.700	5.200	0.900	3.950	4.500	3.050	4.169	2.042
ATRAZINE	4	8.950	-0.423	18.323	8.550	3.700	15.000	3.900	14.000	11.300	10.100	34.697	5.890
METOLACHLOR	4	5.150	-1.876	12.176	4.100	1.400	11.000	1.750	8.550	9.600	6.800	19.497	4.416
July													
ACETOCHLOR	5	1.420	-0.376	3.216	1.200	0.200	3.700	0.200	1.800	3.500	1.600	2.092	1.446
ATRAZINE	5	2.560	-0.136	5.256	1.800	0.700	6.000	1.000	3.300	5.300	2.300	4.713	2.171
METOLACHLOR	5	3.100	0.099	6.101	2.900	1.000	7.000	1.200	3.400	6.000	2.200	5.840	2.417

Appendix V Descriptive Statistics

Table V-11 Station PIP-11, Pipe Creek near Bunker Hill

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	0.387	0.087	0.686	0.200	0.000	2.100	0.100	0.600	2.100	0.500	0.293	0.541
ATRAZINE	15	1.440	0.623	2.257	1.000	0.000	5.200	0.400	1.800	5.200	1.400	2.175	1.475
METOLACHLOR	15	1.847	1.015	2.679	1.600	0.200	5.600	0.700	2.300	5.400	1.600	2.257	1.502
April													
ACETOCHLOR	2	1.350	-8.180	10.880	1.350	0.600	2.100	n/a	n/a	1.500	n/a	1.125	1.061
ATRAZINE	2	2.300	-21.842	26.442	2.300	0.400	4.200	n/a	n/a	3.800	n/a	7.220	2.687
METOLACHLOR	2	3.150	-27.980	34.280	3.150	0.700	5.600	n/a	n/a	4.900	n/a	12.005	3.465
May													
ACETOCHLOR	4	0.350	-0.266	0.966	0.250	0.000	0.900	0.100	0.600	0.900	0.500	0.150	0.387
ATRAZINE	4	1.100	-0.186	2.386	1.300	0.000	1.800	0.500	1.700	1.800	1.200	0.653	0.808
METOLACHLOR	4	1.475	0.874	2.076	1.500	1.100	1.800	1.150	1.800	0.700	0.650	0.143	0.377
June													
ACETOCHLOR	4	0.325	-0.028	0.678	0.300	0.100	0.600	0.150	0.500	0.500	0.350	0.049	0.222
ATRAZINE	4	2.075	-1.326	5.476	1.250	0.600	5.200	0.700	3.450	4.600	2.750	4.569	2.138
METOLACHLOR	4	1.950	-1.073	4.973	1.400	0.500	4.500	0.500	3.400	4.000	2.900	3.610	1.900
July													
ACETOCHLOR	5	0.080	-0.024	0.184	0.100	0.000	0.200	0.000	0.100	0.200	0.100	0.007	0.084
ATRAZINE	5	0.860	-0.088	1.808	0.400	0.300	2.100	0.400	1.100	1.800	0.700	0.583	0.764
METOLACHLOR	5	1.540	0.318	2.762	1.600	0.200	2.700	1.000	2.200	2.500	1.200	0.968	0.984

Appendix V Descriptive Statistics

Table V-12 Station ELL-53, Eel River at North Manchester

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	0.367	0.014	0.720	0.200	0.000	2.500	0.000	0.300	2.500	0.300	0.407	0.638
ATRAZINE	15	1.173	0.004	2.343	0.400	0.000	8.300	0.200	1.400	8.300	1.200	4.458	2.111
METOLACHLOR	15	0.807	0.069	1.544	0.200	0.000	5.000	0.200	0.900	5.000	0.700	1.775	1.332
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.050	-0.585	0.685	0.050	0.000	0.100	n/a	n/a	0.100	n/a	0.005	0.071
May													
ACETOCHLOR	4	0.225	-0.103	0.553	0.200	0.000	0.500	0.100	0.350	0.500	0.250	0.043	0.206
ATRAZINE	4	0.425	0.097	0.753	0.450	0.200	0.600	0.250	0.600	0.400	0.350	0.042	0.206
METOLACHLOR	4	0.250	0.091	0.409	0.200	0.200	0.400	0.200	0.300	0.200	0.100	0.010	0.100
June													
ACETOCHLOR	4	0.750	-1.117	2.617	0.250	0.000	2.500	0.100	1.400	2.500	1.300	1.377	1.173
ATRAZINE	4	2.550	-3.611	8.711	0.850	0.200	8.300	0.250	4.850	8.100	4.600	14.990	3.872
METOLACHLOR	4	1.550	-2.153	5.253	0.550	0.100	5.000	0.150	2.950	4.900	2.800	5.417	2.327
July													
ACETOCHLOR	5	0.320	-0.114	0.754	0.300	0.000	0.900	0.100	0.300	0.900	0.200	0.122	0.349
ATRAZINE	5	1.140	-0.211	2.491	0.500	0.400	2.900	0.400	1.500	2.500	1.100	1.183	1.088
METOLACHLOR	5	0.960	-0.258	2.178	0.600	0.200	2.600	0.300	1.100	2.400	0.800	0.963	0.981

Appendix V Descriptive Statistics

Table V-13 Station ELL-7, Eel River near Logansport

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	15	1.487	-0.493	3.466	0.400	0.000	14.000	0.000	1.200	14.000	1.200	12.776	3.574
ATRAZINE	15	2.573	-0.070	5.217	0.900	0.100	18.000	0.400	2.200	17.900	1.800	22.788	4.774
METOLACHLOR	15	1.540	-0.021	3.101	0.500	0.000	9.900	0.300	1.100	9.900	0.800	7.947	2.819
April													
ACETOCHLOR	2	0.050	-0.585	0.685	0.050	0.000	0.100	n/a	n/a	0.100	n/a	0.005	0.071
ATRAZINE	2	0.150	-0.485	0.785	0.150	0.100	0.200	n/a	n/a	0.100	n/a	0.005	0.071
METOLACHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	4.050	-6.566	14.666	1.100	0.000	14.000	0.250	7.850	14.000	7.600	44.510	6.672
ATRAZINE	4	5.475	-7.877	18.827	1.850	0.200	18.000	0.850	10.100	17.800	9.250	70.409	8.391
METOLACHLOR	4	2.925	-4.489	10.339	0.750	0.300	9.900	0.400	5.450	9.600	5.050	21.709	4.659
June													
ACETOCHLOR	4	1.275	-0.980	3.530	0.800	0.200	3.300	0.300	2.250	3.100	1.950	2.009	1.417
ATRAZINE	4	3.250	-2.729	9.229	1.800	0.600	8.800	1.000	5.500	8.200	4.500	14.117	3.757
METOLACHLOR	4	2.075	-2.764	6.914	0.750	0.200	6.600	0.300	3.850	6.400	3.550	9.249	3.041
July													
ACETOCHLOR	5	0.180	-0.074	0.434	0.100	0.000	0.400	0.000	0.400	0.400	0.400	0.042	0.205
ATRAZINE	5	0.680	0.359	1.001	0.600	0.400	1.000	0.500	0.900	0.600	0.400	0.067	0.259
METOLACHLOR	5	0.620	0.144	1.096	0.500	0.300	1.200	0.300	0.800	0.900	0.500	0.147	0.383

Appendix V Descriptive Statistics

Table V-14 Station WB-354, Wabash River at Logansport

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	15	1.053	0.333	1.773	0.700	0.000	4.600	0.200	1.200	4.600	1.000	1.690	1.300
ATRAZINE	15	3.607	0.797	6.417	1.600	0.000	16.000	0.600	4.500	16.000	3.900	25.749	5.074
METOLACHLOR	15	2.720	0.817	4.623	1.200	0.200	13.000	1.000	3.600	12.800	2.600	11.806	3.436
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.100	-1.171	1.371	0.100	0.000	0.200	n/a	n/a	0.200	n/a	0.020	0.141
METOLACHLOR	2	0.250	-0.385	0.885	0.250	0.200	0.300	n/a	n/a	0.100	n/a	0.005	0.071
May													
ACETOCHLOR	4	0.675	0.475	0.875	0.700	0.500	0.800	0.600	0.750	0.300	0.150	0.016	0.126
ATRAZINE	4	1.700	-0.183	3.583	1.300	0.800	3.400	0.900	2.500	2.600	1.600	1.400	1.183
METOLACHLOR	4	1.225	0.410	2.040	1.150	0.700	1.900	0.850	1.600	1.200	0.750	0.263	0.512
June													
ACETOCHLOR	4	2.175	-0.828	5.178	1.850	0.400	4.600	0.700	3.650	4.200	2.950	3.562	1.887
ATRAZINE	4	9.525	-1.542	20.592	9.750	2.600	16.000	3.550	15.500	13.400	11.950	48.369	6.955
METOLACHLOR	4	5.700	-3.029	14.429	4.400	1.000	13.000	1.500	9.900	12.000	8.400	30.093	5.486
July													
ACETOCHLOR	5	0.880	-0.501	2.261	0.200	0.100	2.700	0.200	1.200	2.600	1.000	1.237	1.112
ATRAZINE	5	1.800	-0.652	4.252	1.000	0.400	5.200	0.600	1.800	4.800	1.200	3.900	1.975
METOLACHLOR	5	2.520	-0.066	5.106	1.200	1.000	5.700	1.100	3.600	4.700	2.500	4.337	2.083

Appendix V Descriptive Statistics

Table V-15 Station DC-5, Deer Creek near Delphi

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	14	0.236	0.081	0.390	0.100	0.000	0.800	0.100	0.300	0.800	0.200	0.072	0.268
ATRAZINE	14	1.229	0.580	1.877	0.750	0.300	3.500	0.400	2.000	3.200	1.600	1.262	1.123
METOLACHLOR	14	1.600	0.658	2.542	1.150	0.200	6.400	0.500	2.200	6.200	1.700	2.663	1.632
April													
ACETOCHLOR	2	0.250	-0.385	0.885	0.250	0.200	0.300	n/a	n/a	0.100	n/a	0.005	0.071
ATRAZINE	2	0.300	n/a	n/a	0.300	0.300	0.300	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	3	0.467	-0.332	1.265	0.600	0.100	0.700	n/a	n/a	0.600	n/a	0.103	0.321
ATRAZINE	3	2.200	-0.812	5.212	2.900	0.800	2.900	n/a	n/a	2.100	n/a	1.470	1.212
METOLACHLOR	3	1.667	-0.990	4.323	1.900	0.500	2.600	n/a	n/a	2.100	n/a	1.143	1.069
June													
ACETOCHLOR	4	0.250	-0.338	0.838	0.100	0.000	0.800	0.050	0.450	0.800	0.400	0.137	0.370
ATRAZINE	4	1.825	-0.202	3.852	1.650	0.500	3.500	0.900	2.750	3.000	1.850	1.623	1.274
METOLACHLOR	4	2.400	-2.038	6.838	1.450	0.300	6.400	0.500	4.300	6.100	3.800	7.780	2.789
July													
ACETOCHLOR	5	0.080	-0.024	0.184	0.100	0.000	0.200	0.000	0.100	0.200	0.100	0.007	0.084
ATRAZINE	5	0.540	0.228	0.852	0.400	0.300	0.900	0.400	0.700	0.600	0.300	0.063	0.251
METOLACHLOR	5	1.480	0.513	2.447	1.500	0.600	2.300	0.800	2.200	1.700	1.400	0.607	0.779

Appendix V Descriptive Statistics

Table V-16 Station TR-159, Tippecanoe River at Oswego

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	15	0.013	-0.015	0.042	0.000	0.000	0.200	0.000	0.000	0.200	0.000	0.003	0.052
ATRAZINE	15	0.400	0.311	0.489	0.400	0.000	0.600	0.300	0.500	0.600	0.200	0.026	0.160
METOLACHLOR	15	0.200	0.145	0.255	0.200	0.100	0.500	0.100	0.200	0.400	0.100	0.010	0.100
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.250	-2.927	3.427	0.250	0.000	0.500	n/a	n/a	0.500	n/a	0.125	0.354
METOLACHLOR	2	0.150	-0.485	0.785	0.150	0.100	0.200	n/a	n/a	0.100	n/a	0.005	0.071
May													
ACETOCHLOR	4	0.000	n/a	n/a	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ATRAZINE	4	0.350	0.074	0.626	0.300	0.200	0.600	0.250	0.450	0.400	0.200	0.030	0.173
METOLACHLOR	4	0.150	0.058	0.242	0.150	0.100	0.200	0.100	0.200	0.100	0.100	0.003	0.058
June													
ACETOCHLOR	4	0.050	-0.109	0.209	0.000	0.000	0.200	0.000	0.100	0.200	0.100	0.010	0.100
ATRAZINE	4	0.450	0.291	0.609	0.400	0.400	0.600	0.400	0.500	0.200	0.100	0.010	0.100
METOLACHLOR	4	0.275	0.036	0.514	0.200	0.200	0.500	0.200	0.350	0.300	0.150	0.022	0.150
July													
ACETOCHLOR	5	0.000	n/a	n/a	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ATRAZINE	5	0.460	0.349	0.571	0.500	0.300	0.500	0.500	0.500	0.200	0.000	0.008	0.089
METOLACHLOR	5	0.200	0.112	0.288	0.200	0.100	0.300	0.200	0.200	0.200	0.000	0.005	0.071

Appendix V Descriptive Statistics

Table V-17 Station TR-79, Tippecanoe River near Ora

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	14	0.214	-0.022	0.451	0.000	0.000	1.300	0.000	0.200	1.300	0.200	0.167	0.409
ATRAZINE	14	0.636	0.290	0.981	0.450	0.000	1.800	0.300	0.800	1.800	0.500	0.358	0.598
METOLACHLOR	14	0.421	-0.010	0.853	0.200	0.000	2.900	0.000	0.400	2.900	0.400	0.559	0.747
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	0.375	-0.618	1.368	0.100	0.000	1.300	0.000	0.750	1.300	0.750	0.389	0.624
ATRAZINE	4	0.725	-0.489	1.939	0.550	0.000	1.800	0.250	1.200	1.800	0.950	0.583	0.763
METOLACHLOR	4	0.275	0.123	0.427	0.250	0.200	0.400	0.200	0.350	0.200	0.150	0.009	0.096
June													
ACETOCHLOR	3	0.067	-0.220	0.354	0.000	0.000	0.200	n/a	n/a	0.200	n/a	0.013	0.115
ATRAZINE	3	0.633	-0.592	1.859	0.400	0.300	1.200	n/a	n/a	0.900	n/a	0.243	0.493
METOLACHLOR	3	0.133	-0.440	0.707	0.000	0.000	0.400	n/a	n/a	0.400	n/a	0.053	0.231
July													
ACETOCHLOR	5	0.260	-0.264	0.784	0.100	0.000	1.000	0.000	0.200	1.000	0.200	0.178	0.422
ATRAZINE	5	0.820	0.083	1.557	0.800	0.300	1.800	0.400	0.800	1.500	0.400	0.352	0.593
METOLACHLOR	5	0.880	-0.561	2.321	0.400	0.100	2.900	0.200	0.800	2.800	0.600	1.347	1.161

Appendix V Descriptive Statistics

Table V-18 Station TR-9, Tippecanoe River near Delphi

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	15	0.320	0.089	0.551	0.200	0.000	1.600	0.000	0.400	1.600	0.400	0.175	0.418
ATRAZINE	15	1.773	0.512	3.035	1.000	0.000	8.600	0.400	2.100	8.600	1.700	5.188	2.278
METOLACHLOR	15	0.893	0.294	1.493	0.500	0.000	4.400	0.300	1.300	4.400	1.000	1.172	1.083
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.100	-1.171	1.371	0.100	0.000	0.200	n/a	n/a	0.200	n/a	0.020	0.141
METOLACHLOR	2	0.050	-0.585	0.685	0.050	0.000	0.100	n/a	n/a	0.100	n/a	0.005	0.071
May													
ACETOCHLOR	4	0.325	-0.150	0.800	0.300	0.000	0.700	0.100	0.550	0.700	0.450	0.089	0.299
ATRAZINE	4	1.200	-0.543	2.943	0.800	0.400	2.800	0.500	1.900	2.400	1.400	1.200	1.095
METOLACHLOR	4	0.675	0.089	1.261	0.700	0.200	1.100	0.450	0.900	0.900	0.450	0.136	0.369
June													
ACETOCHLOR	4	0.700	-0.289	1.689	0.500	0.200	1.600	0.300	1.100	1.400	0.800	0.387	0.622
ATRAZINE	4	4.325	-0.799	9.449	3.550	1.600	8.600	1.850	6.800	7.000	4.950	10.369	3.220
METOLACHLOR	4	1.725	-1.242	4.692	1.050	0.400	4.400	0.450	3.000	4.000	2.550	3.476	1.864
July													
ACETOCHLOR	5	0.140	-0.027	0.307	0.200	0.000	0.300	0.000	0.200	0.300	0.200	0.018	0.134
ATRAZINE	5	0.860	0.315	1.405	0.700	0.400	1.500	0.600	1.100	1.100	0.500	0.193	0.439
METOLACHLOR	5	0.740	0.097	1.383	0.500	0.300	1.300	0.300	1.300	1.000	1.000	0.268	0.518

Appendix V Descriptive Statistics

Table V-19 Station WC-80, Wildcat Creek near Jerome

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-May													
ACETOCHLOR	15	0.450	0.058	0.835	0.200	0.000	2.600	0.000	0.500	2.600	0.500	0.493	0.702
ATRAZINE	15	2.860	0.861	4.859	1.300	0.000	11.000	0.300	4.100	11.000	3.800	13.025	3.609
METOLACHLOR	15	1.480	0.600	2.360	0.900	0.200	5.700	0.600	2.100	5.500	1.500	2.527	1.590
April													
ACETOCHLOR	2	0.100	-1.171	1.371	0.100	0.000	0.200	n/a	n/a	0.200	n/a	0.020	0.141
ATRAZINE	2	0.300	n/a	n/a	0.300	0.300	0.300	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.550	-0.085	1.185	0.550	0.500	0.600	n/a	n/a	0.100	n/a	0.005	0.071
May													
ACETOCHLOR	4	0.825	-1.059	2.709	0.250	0.200	2.600	0.200	1.450	2.400	1.250	1.403	1.184
ATRAZINE	4	2.900	-4.684	10.484	0.800	0.000	10.000	0.150	5.650	10.000	5.500	22.713	4.766
METOLACHLOR	4	0.625	-0.079	1.329	0.600	0.200	1.100	0.250	1.000	0.900	0.750	0.195	0.443
June													
ACETOCHLOR	4	0.675	-0.229	1.579	0.500	0.200	1.500	0.350	1.000	1.300	0.650	0.323	0.568
ATRAZINE	4	5.425	-1.706	12.556	4.550	1.600	11.000	1.800	9.050	9.400	7.250	20.083	4.481
METOLACHLOR	4	2.950	-1.085	6.985	2.750	0.600	5.700	0.800	5.100	5.100	4.300	6.430	2.536
July													
ACETOCHLOR	5	0.100	-0.076	0.276	0.000	0.000	0.300	0.000	0.200	0.300	0.200	0.020	0.141
ATRAZINE	5	1.800	-0.054	3.654	1.100	0.600	4.100	0.700	2.500	3.500	1.800	2.230	1.493
METOLACHLOR	5	1.360	0.454	2.266	1.000	0.700	2.200	0.800	2.100	1.500	1.300	0.533	0.730

Appendix V Descriptive Statistics

Table V-20 Station WC-60, Wildcat Creek at Kokomo

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	15	0.287	0.094	0.479	0.200	0.000	1.100	0.000	0.400	1.100	0.400	0.121	0.348
ATRAZINE	15	2.153	0.861	3.446	1.200	0.200	8.000	0.700	2.600	7.800	1.900	5.446	2.334
METOLACHLOR	15	1.433	0.625	2.241	0.900	0.300	5.500	0.300	2.200	5.200	1.900	2.123	1.459
April													
ACETOCHLOR	2	0.050	-0.585	0.685	0.050	0.000	0.100	n/a	n/a	0.100	n/a	0.005	0.071
ATRAZINE	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.300	n/a	n/a	0.300	0.300	0.300	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	0.475	-0.126	1.076	0.400	0.100	1.000	0.250	0.700	0.900	0.450	0.143	0.377
ATRAZINE	4	1.525	0.318	2.732	1.300	0.900	2.600	1.000	2.050	1.700	1.050	0.576	0.759
METOLACHLOR	4	0.975	0.202	1.748	0.900	0.500	1.600	0.600	1.350	1.100	0.750	0.236	0.486
June													
ACETOCHLOR	4	0.475	-0.241	1.191	0.350	0.100	1.100	0.150	0.800	1.000	0.650	0.203	0.450
ATRAZINE	4	4.225	-1.580	10.030	3.950	1.000	8.000	1.100	7.350	7.000	6.250	13.309	3.648
METOLACHLOR	4	2.400	-1.671	6.471	1.900	0.300	5.500	0.300	4.500	5.200	4.200	6.547	2.559
July													
ACETOCHLOR	5	0.080	-0.056	0.216	0.000	0.000	0.200	0.000	0.200	0.200	0.200	0.012	0.110
ATRAZINE	5	1.780	0.079	3.481	1.600	0.500	3.900	0.700	2.200	3.400	1.500	1.877	1.370
METOLACHLOR	5	1.480	0.537	2.423	1.100	0.800	2.400	0.900	2.200	1.600	1.300	0.577	0.760

Appendix V Descriptive Statistics

Table V-21 Station WC-15, Wildcat Creek at Owasco

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	14	0.25	0.046	0.454	0.150	0.00	1.300	0.000	0.300	1.300	0.300	0.124	0.352
ATRAZINE	14	1.81428	0.406	3.222	1.000	0.200	9.000	0.400	1.800	8.800	1.400	5.946	2.438
METOLACHLOR	14	1.19285	0.332	2.054	0.700	0.200	5.600	0.300	1.300	5.400	1.000	2.224	1.491
April			Confid.	Confid									
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	0.350	0.074	0.626	0.300	0.200	0.600	0.250	0.450	0.400	0.200	0.030	0.173
ATRAZINE	4	1.400	0.267	2.533	1.600	0.400	2.000	0.900	1.900	1.600	1.000	0.507	0.712
METOLACHLOR	4	0.825	0.316	1.334	0.700	0.600	1.300	0.650	1.000	0.700	0.350	0.103	0.320
June													
ACETOCHLOR	3	0.467	-1.330	2.264	0.100	0.000	1.300	n/a	n/a	1.300	n/a	0.523	0.723
ATRAZINE	3	3.533	-8.230	15.297	0.900	0.700	9.000	n/a	n/a	8.300	n/a	22.423	4.735
METOLACHLOR	3	2.033	-5.641	9.707	0.300	0.200	5.600	n/a	n/a	5.400	n/a	9.543	3.089
July													
ACETOCHLOR	5	0.14	-0.068	0.348	0.100	0.000	0.400	0.000	0.200	0.400	0.200	0.028	0.167
ATRAZINE	5	1.76	-0.735	4.255	1.100	0.400	5.300	0.700	1.300	4.900	0.600	4.038	2.009
METOLACHLOR	5	1.38	0.033	2.727	1.000	0.500	3.200	0.700	1.500	2.700	0.800	1.177	1.084

Appendix V Descriptive Statistics

Table V-22 Station WCS-.4, South Fork Wildcat Creek near Lafayette

April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	14	0.357	0.059	0.656	0.200	0.000	1.700	0.000	0.300	1.700	0.300	0.267	0.517
ATRAZINE	14	1.764	0.699	2.830	1.150	0.000	5.500	0.400	2.600	5.500	2.200	3.404	1.845
METOLACHLOR	14	1.579	0.519	2.638	0.950	0.100	6.700	0.400	1.900	6.600	1.500	3.366	1.835
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.150	-1.756	2.056	0.150	0.000	0.300	n/a	n/a	0.300	n/a	0.045	0.212
METOLACHLOR	2	0.300	-2.241	2.841	0.300	0.100	0.500	n/a	n/a	0.400	n/a	0.080	0.283
May													
ACETOCHLOR	3	1.033	-0.711	2.778	1.100	0.300	1.700	n/a	n/a	1.400	n/a	0.493	0.702
ATRAZINE	3	3.667	-1.510	8.844	4.100	1.400	5.500	n/a	n/a	4.100	n/a	4.343	2.084
METOLACHLOR	3	3.533	-3.761	10.828	3.000	0.900	6.700	n/a	n/a	5.800	n/a	8.623	2.937
June													
ACETOCHLOR	4	0.350	-0.266	0.966	0.250	0.000	0.900	0.100	0.600	0.900	0.500	0.150	0.387
ATRAZINE	4	2.475	-0.503	5.453	2.150	0.600	5.000	1.150	3.800	4.400	2.650	3.503	1.871
METOLACHLOR	4	1.675	-0.931	4.281	1.250	0.300	3.900	0.450	2.900	3.600	2.450	2.683	1.638
July													
ACETOCHLOR	5	0.100	-0.076	0.276	0.000	0.000	0.300	0.000	0.200	0.300	0.200	0.020	0.141
ATRAZINE	5	0.700	0.003	1.397	0.700	0.000	1.500	0.400	0.900	1.500	0.500	0.315	0.561
METOLACHLOR	5	0.840	0.254	1.426	1.000	0.300	1.400	0.400	1.100	1.100	0.700	0.223	0.472

Appendix V Descriptive Statistics

Table V-23 Station WC-5, Wildcat Creek near Lafayette

	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
April-July													
ACETOCHLOR	14	0.479	0.161	0.797	0.200	0.000	1.400	0.000	1.200	1.400	1.200	0.303	0.551
ATRAZINE	14	2.014	0.774	3.254	1.200	0.000	7.600	0.700	2.700	7.600	2.000	4.614	2.148
METOLACHLOR	14	1.600	0.673	2.527	1.100	0.100	6.000	0.500	2.600	5.900	2.100	2.580	1.606
April													
ACETOCHLOR	2	0.100	-1.171	1.371	0.100	0.000	0.200	n/a	n/a	0.200	n/a	0.020	0.141
ATRAZINE	2	0.150	-0.485	0.785	0.150	0.100	0.200	n/a	n/a	0.100	n/a	0.005	0.071
METOLACHLOR	2	0.150	-0.485	0.785	0.150	0.100	0.200	n/a	n/a	0.100	n/a	0.005	0.071
May													
ACETOCHLOR	3	1.033	0.093	1.974	1.200	0.600	1.300	n/a	n/a	0.700	n/a	0.143	0.379
ATRAZINE	3	2.933	-0.458	6.324	2.700	1.700	4.400	n/a	n/a	2.700	n/a	1.863	1.365
METOLACHLOR	3	2.033	-0.207	4.274	2.100	1.100	2.900	n/a	n/a	1.800	n/a	0.813	0.902
June													
ACETOCHLOR	4	0.475	-0.543	1.493	0.250	0.000	1.400	0.050	0.900	1.400	0.850	0.409	0.640
ATRAZINE	4	3.425	-1.641	8.491	2.700	0.700	7.600	0.950	5.900	6.900	4.950	10.136	3.184
METOLACHLOR	4	2.350	-1.861	6.561	1.550	0.300	6.000	0.400	4.300	5.700	3.900	7.003	2.646
July													
ACETOCHLOR	5	0.300	-0.333	0.933	0.100	0.000	1.200	0.000	0.200	1.200	0.200	0.260	0.510
ATRAZINE	5	1.080	-0.166	2.326	0.800	0.000	2.700	0.700	1.200	2.700	0.500	1.007	1.003
METOLACHLOR	5	1.320	0.161	2.479	1.100	0.500	2.900	0.800	1.300	2.400	0.500	0.872	0.934

Appendix V Descriptive Statistics

Table V-24 Station WB-311 Wabash River at Lafayette

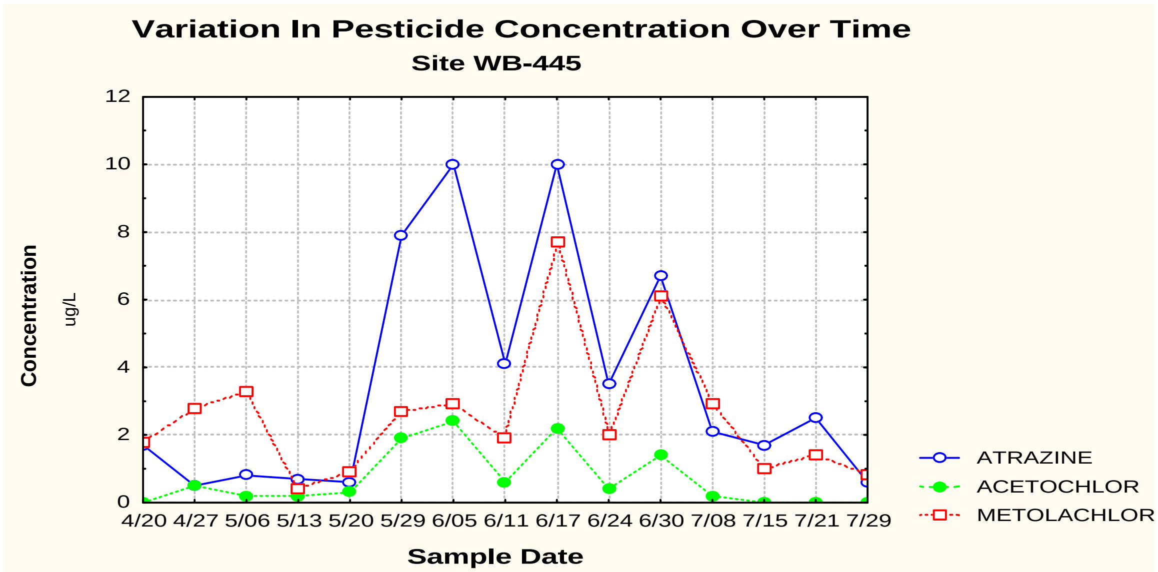
April-July	Valid N	Mean	Confid. -95.000%	Confid. +95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Range	Quartile Range	Variance	Std.Dev.
ACETOCHLOR	15	0.593	0.250	0.936	0.500	0.000	2.300	0.200	0.700	2.300	0.500	0.384	0.619
ATRAZINE	15	2.480	0.739	4.221	1.300	0.200	10.000	0.700	2.500	9.800	1.800	9.880	3.143
METOLACHLOR	15	1.607	0.672	2.541	1.000	0.200	6.200	0.500	2.000	6.000	1.500	2.846	1.687
April													
ACETOCHLOR	2	0.000	n/a	n/a	0.000	0.000	0.000	n/a	n/a	0.000	n/a	0.000	0.000
ATRAZINE	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
METOLACHLOR	2	0.200	n/a	n/a	0.200	0.200	0.200	n/a	n/a	0.000	n/a	0.000	0.000
May													
ACETOCHLOR	4	0.625	0.353	0.897	0.650	0.400	0.800	0.500	0.750	0.400	0.250	0.029	0.171
ATRAZINE	4	1.575	0.204	2.946	1.550	0.700	2.500	0.850	2.300	1.800	1.450	0.743	0.862
METOLACHLOR	4	0.975	0.139	1.811	0.850	0.500	1.700	0.600	1.350	1.200	0.750	0.276	0.525
June													
ACETOCHLOR	4	1.175	-0.342	2.692	1.100	0.200	2.300	0.400	1.950	2.100	1.550	0.909	0.954
ATRAZINE	4	6.200	-0.703	13.103	6.750	1.300	10.000	2.550	9.850	8.700	7.300	18.820	4.338
METOLACHLOR	4	3.050	-1.408	7.508	2.800	0.400	6.200	0.700	5.400	5.800	4.700	7.850	2.802
July													
ACETOCHLOR	5	0.340	0.083	0.597	0.300	0.100	0.600	0.200	0.500	0.500	0.300	0.043	0.207
ATRAZINE	5	1.140	0.347	1.933	1.300	0.300	1.900	0.700	1.500	1.600	0.800	0.408	0.639
METOLACHLOR	5	1.520	0.748	2.292	1.800	0.800	2.100	0.900	2.000	1.300	1.100	0.387	0.622

APPENDIX VI

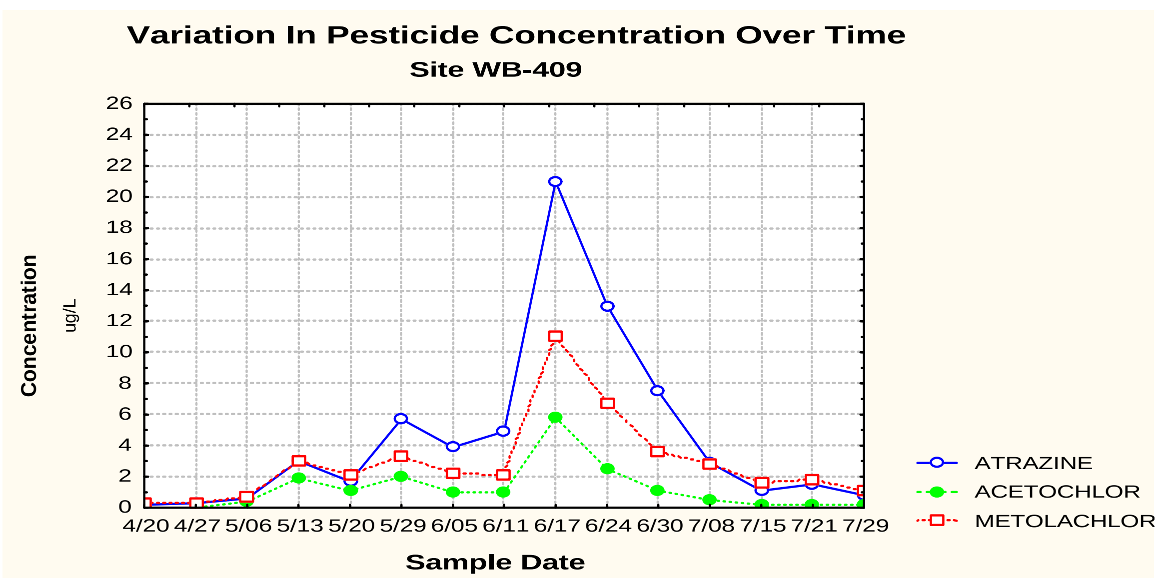
GRAPHS OF THE VARIATION IN PESTICIDES OVER TIME

Appendix VI

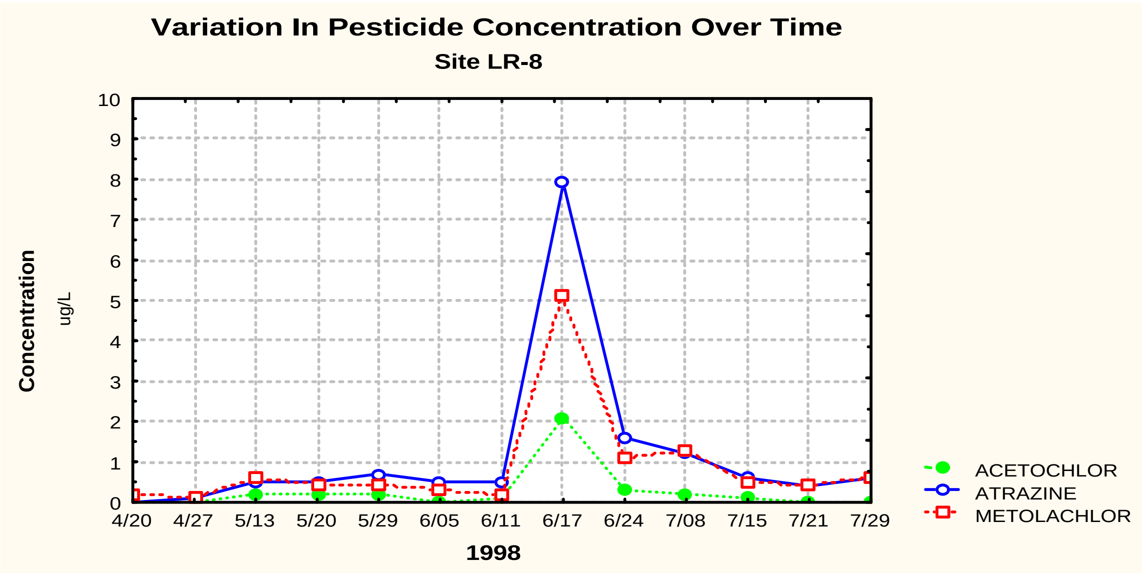
List of Graphs



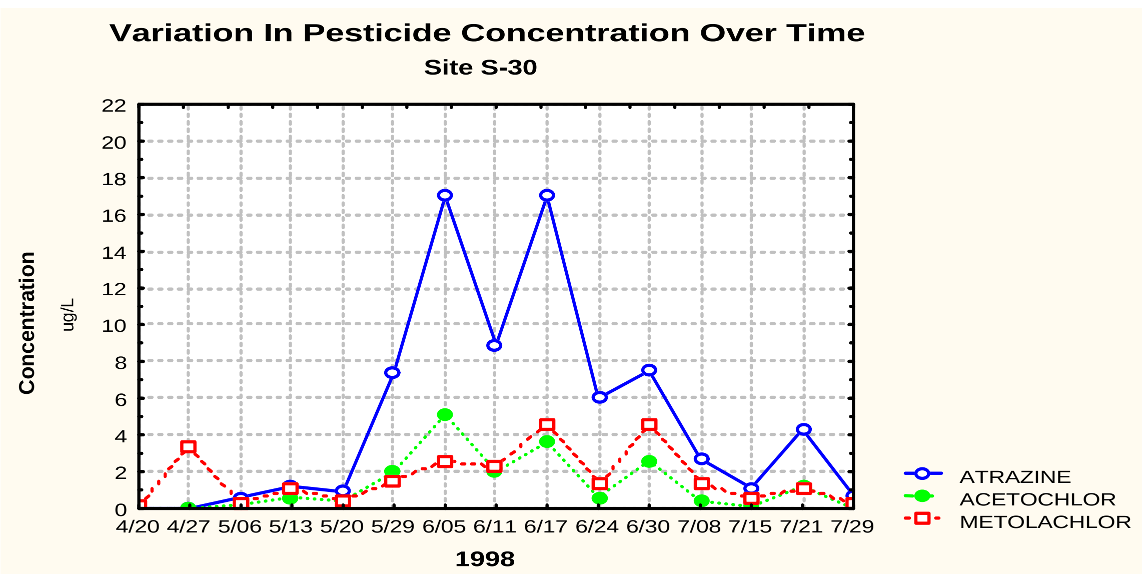
Graph VI-1 Wabash River at Linn Grove



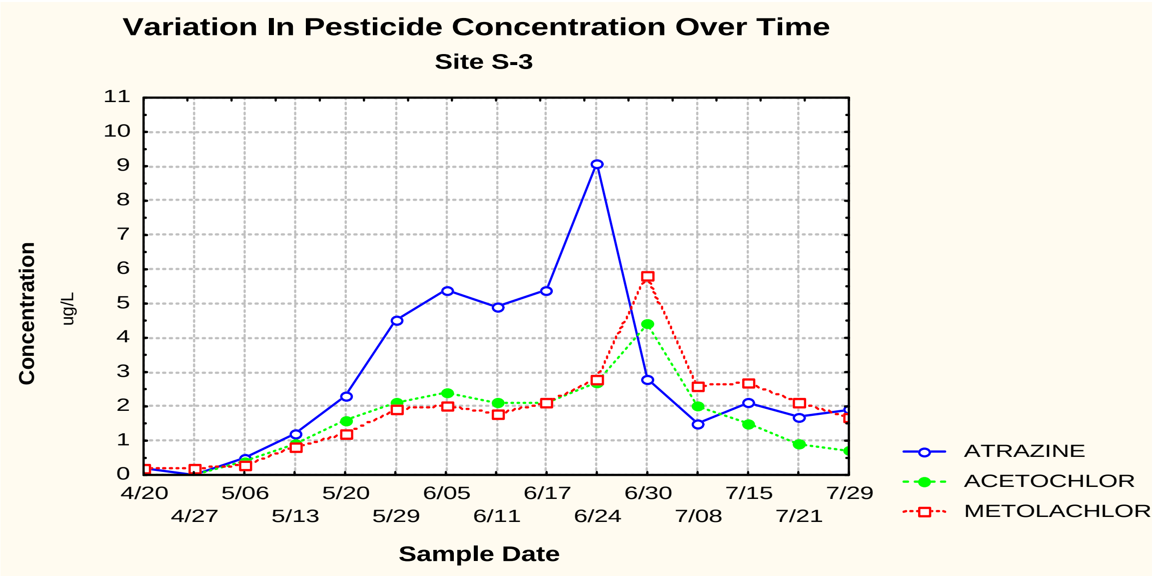
Graph VI-2 Wabash River at Huntington



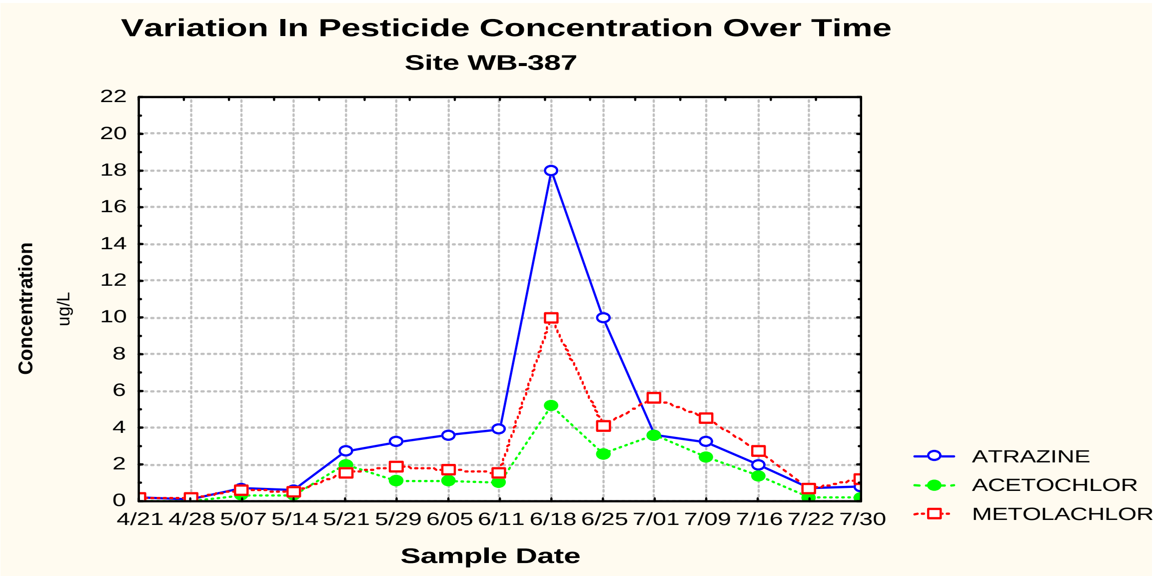
Graph VI-3 Little River near Huntington



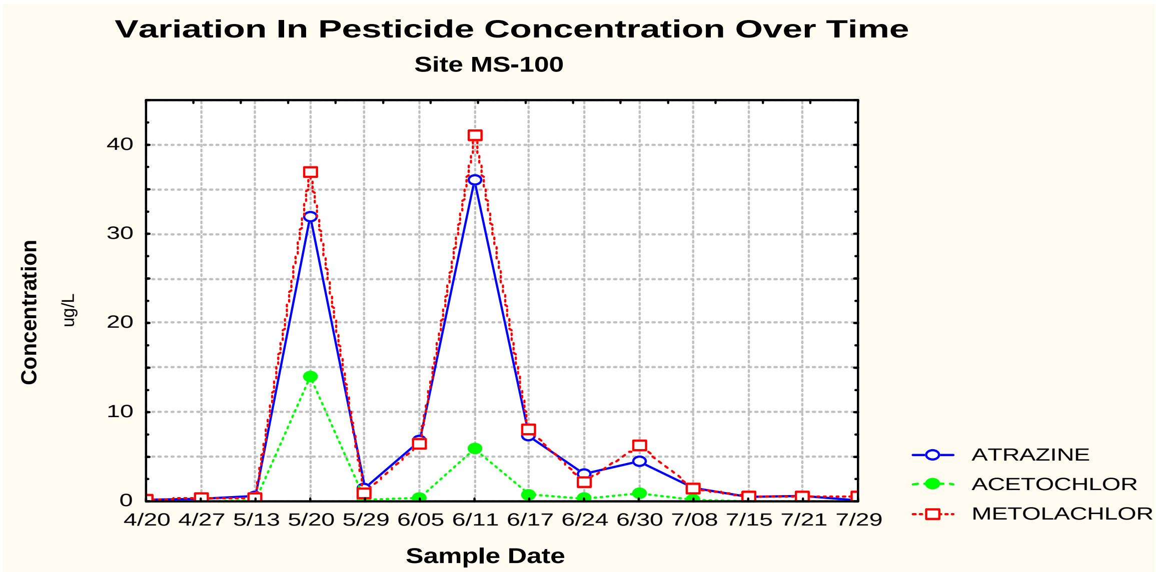
Graph VI-4 Salamonie River near Warren



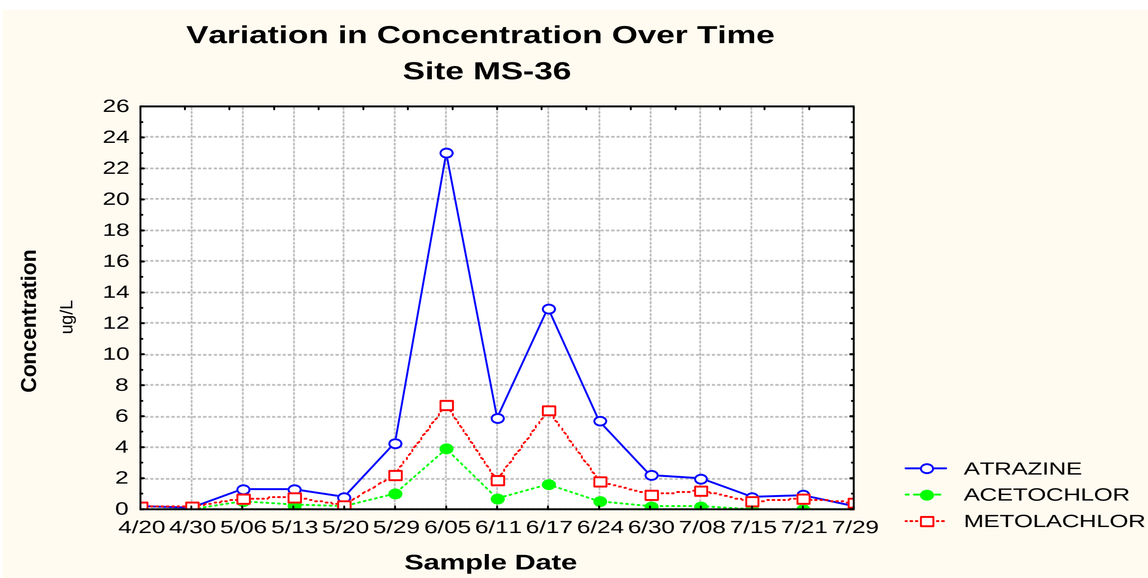
Graph VI-5 Salamonie River at Dora



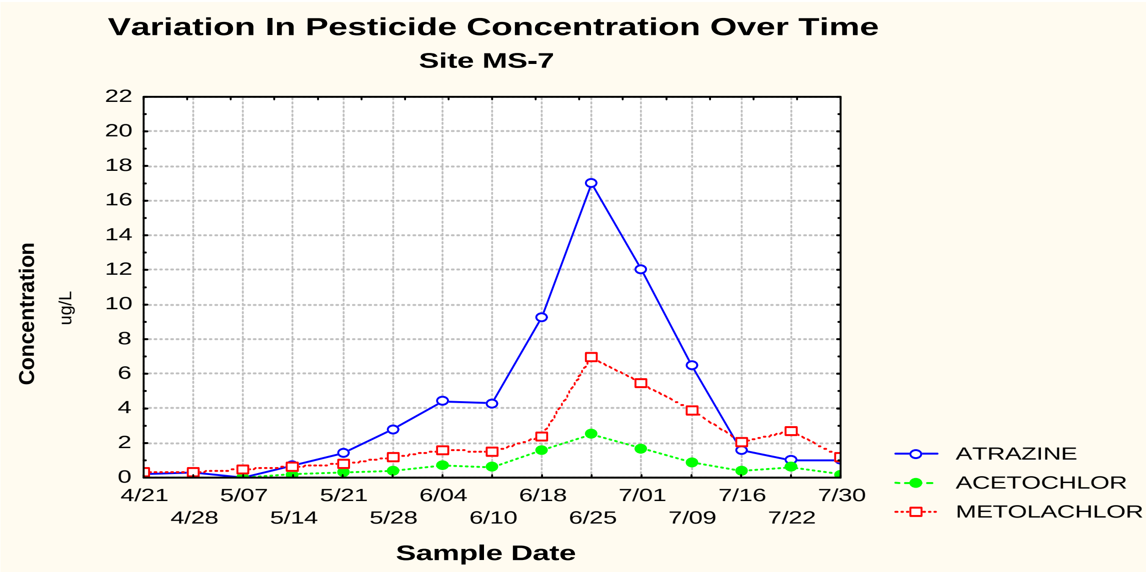
Graph VI-6 Wabash River at City of Wabash



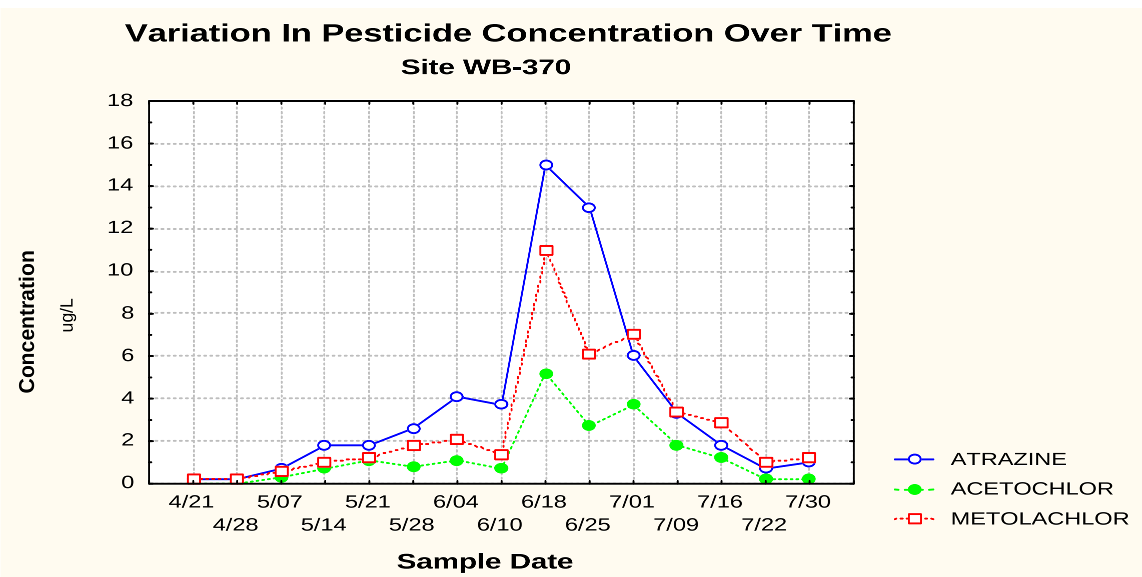
Graph VI-7 Mississinewa River near Ridgeville



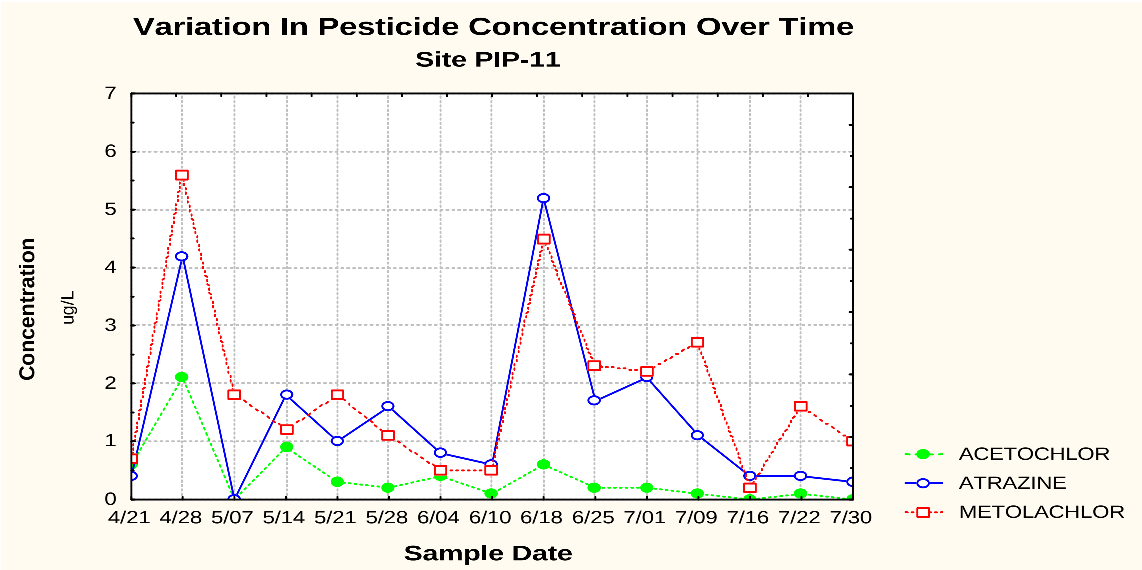
Graph VI-8 Mississinewa River at Marion



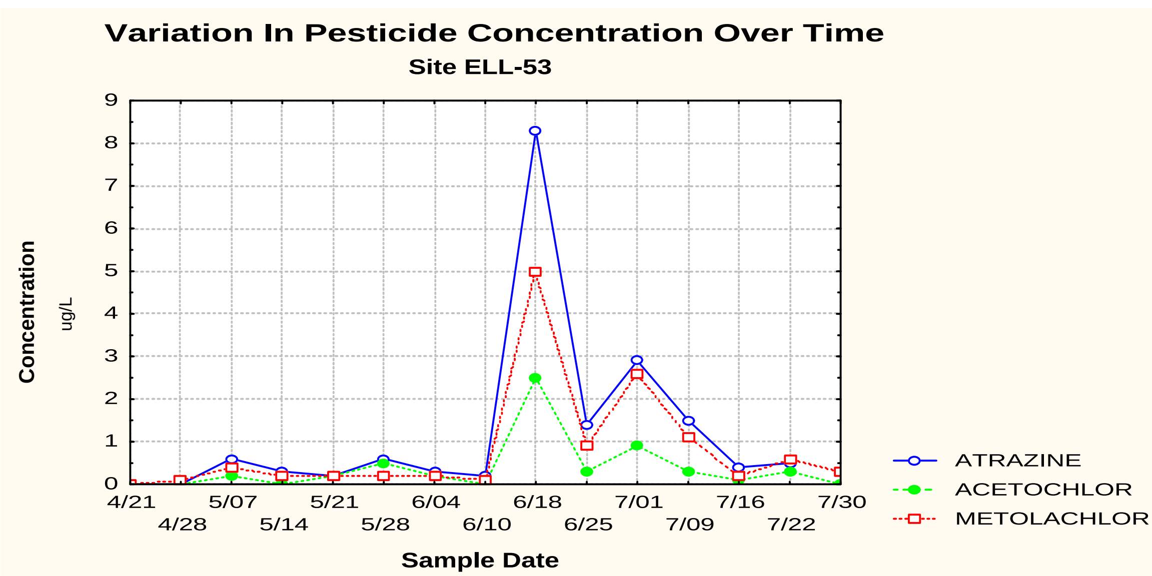
Graph VI-9 Mississinewa River at Peoria



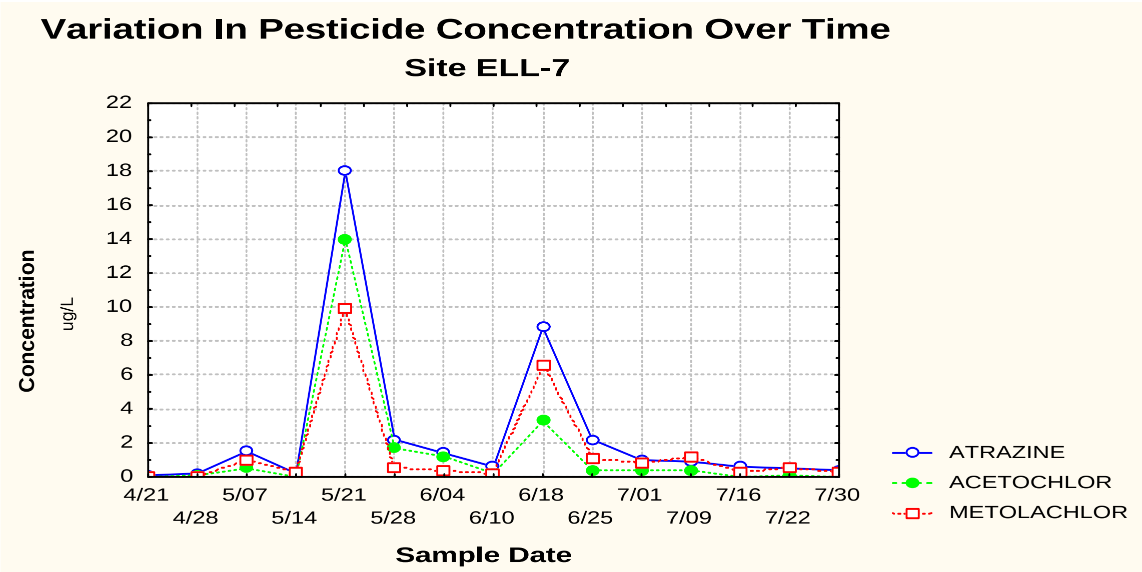
Graph VI-10 Wabash River at Peru



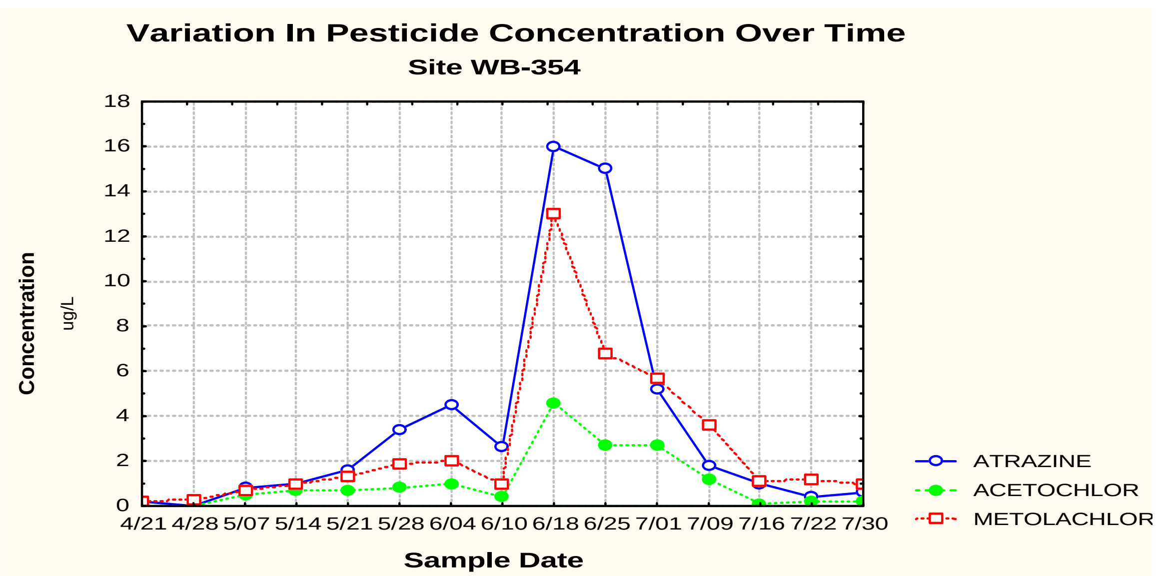
Graph VI-11 Pipe Creek near Bunker Hill



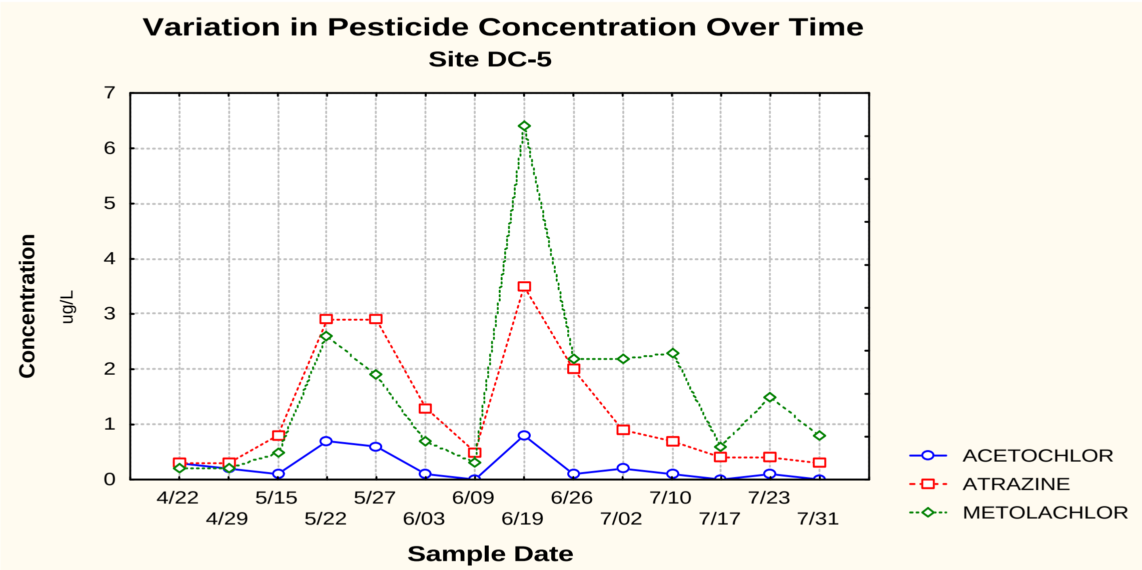
Graph VI-12 Eel River at North Manchester



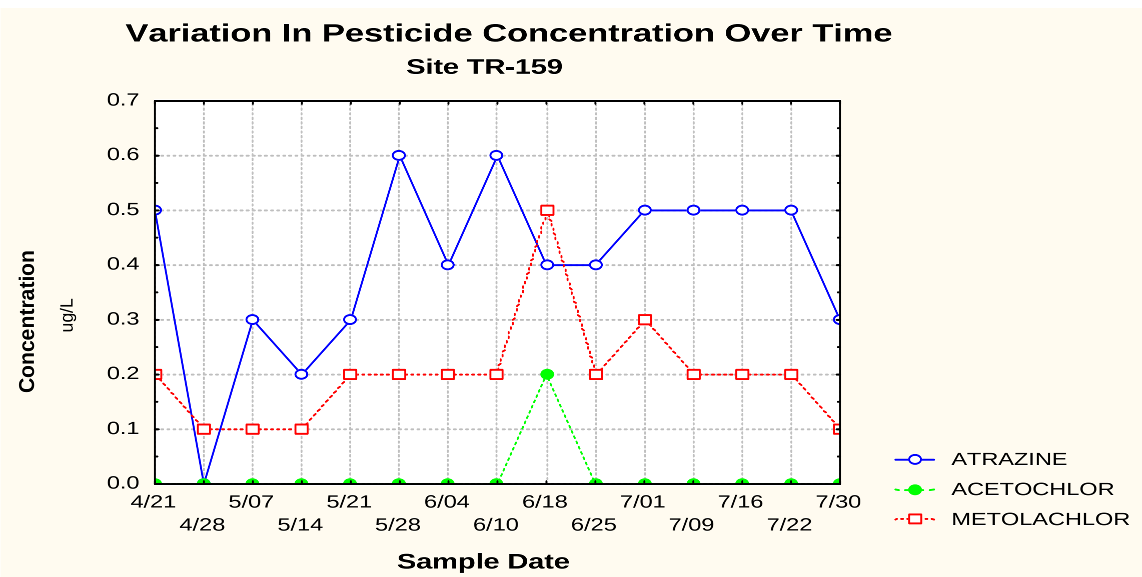
Graph VI-13 Eel River near Logansport



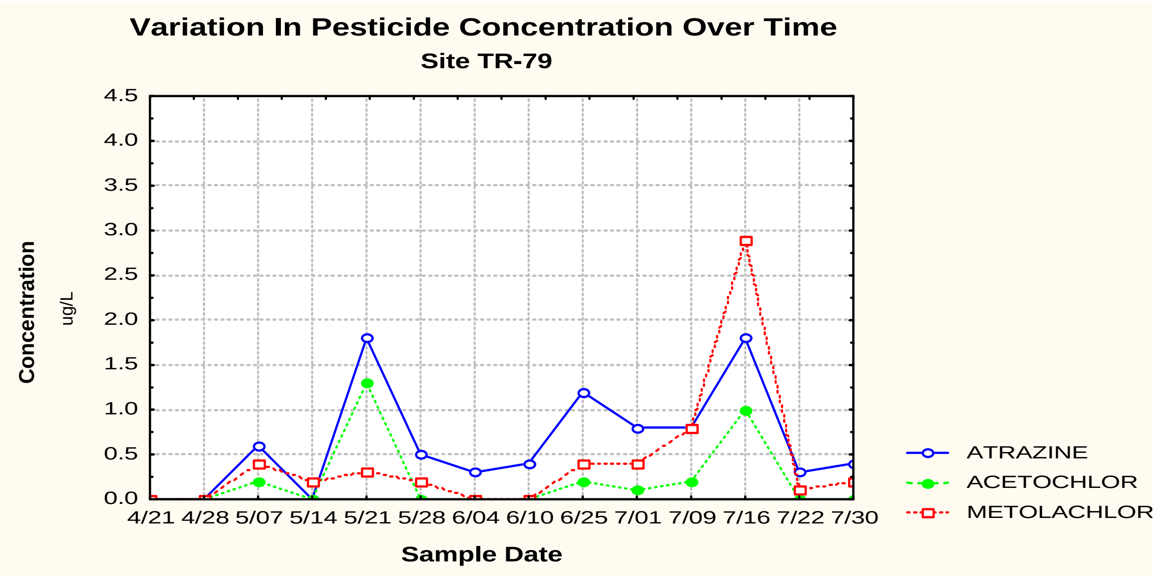
Graph VI-14 Wabash River at Logansport



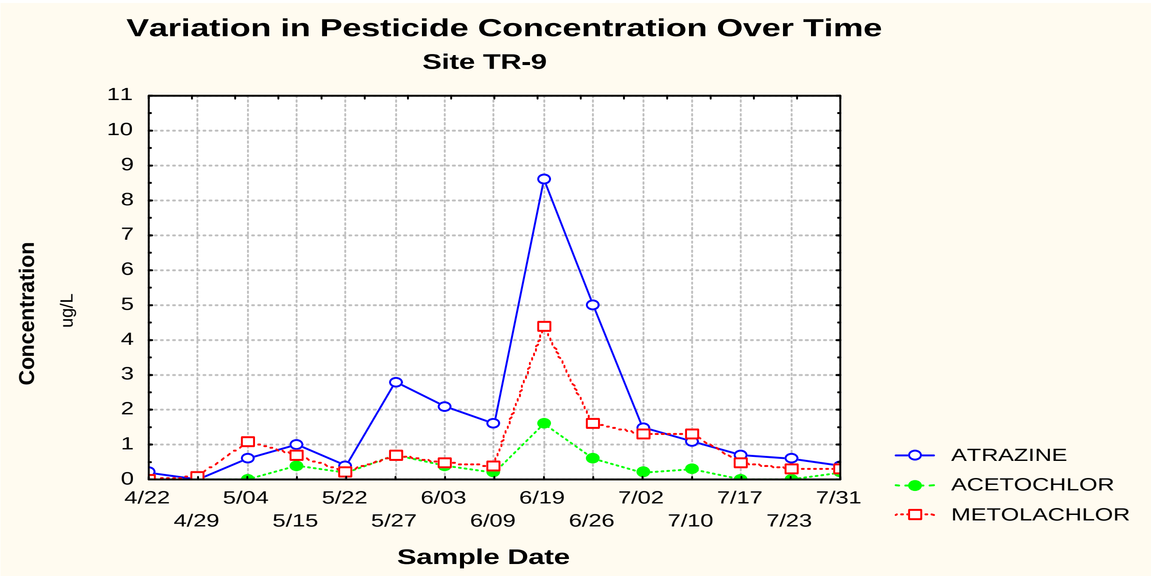
Graph VI-15 Deer Creek near Delphi



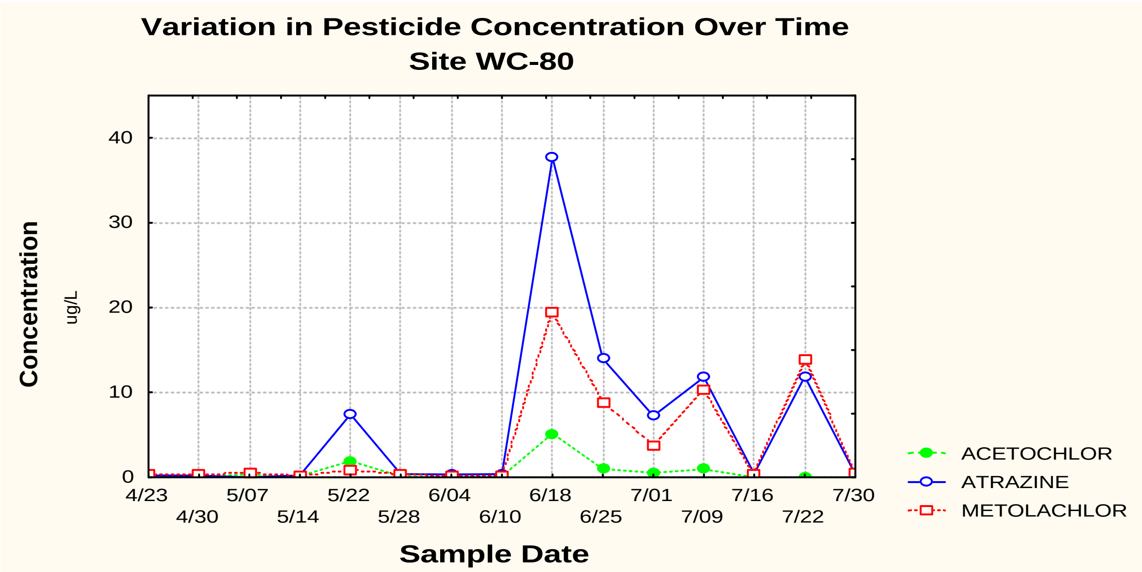
Graph VI-16 Tippecanoe River at Oswego



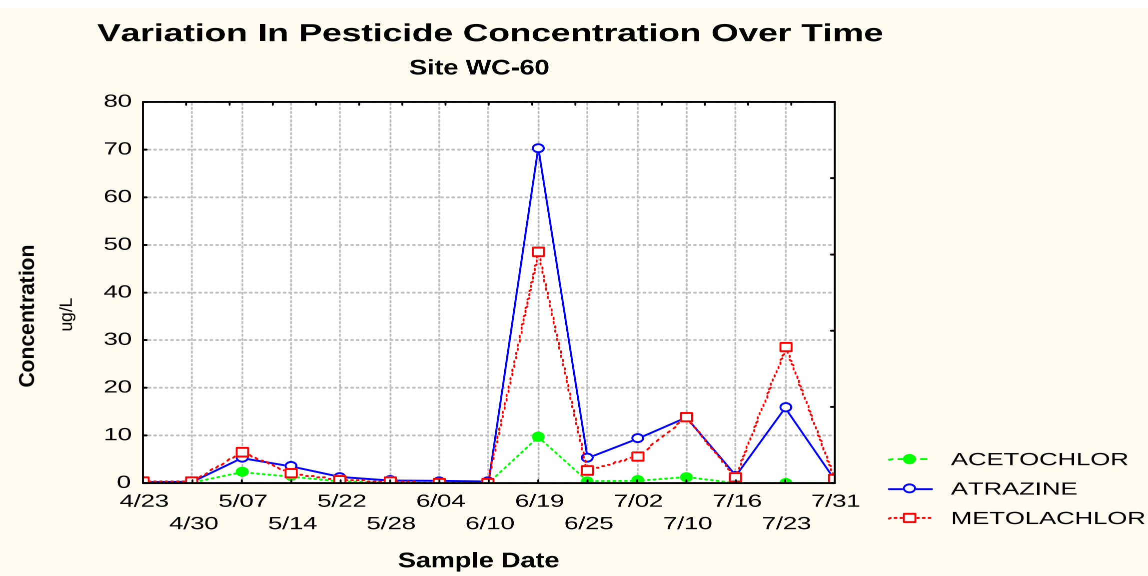
Graph VI-17 Tippecanoe River near Ora



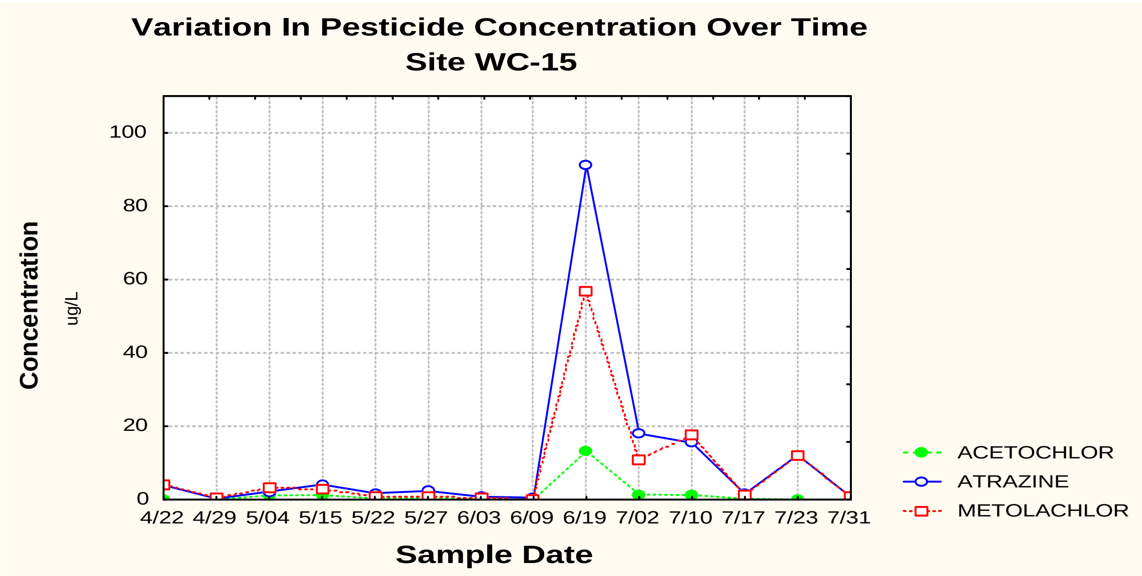
Graph VI-18 Tippecanoe River near Delphi



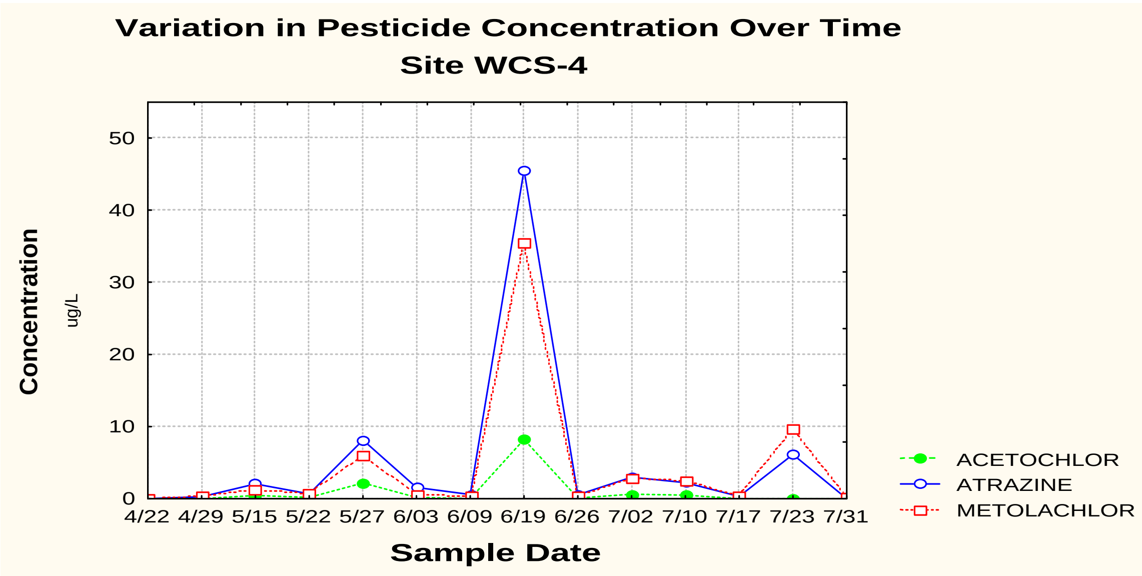
Graph VI-19 Wildcat Creek near Jerome



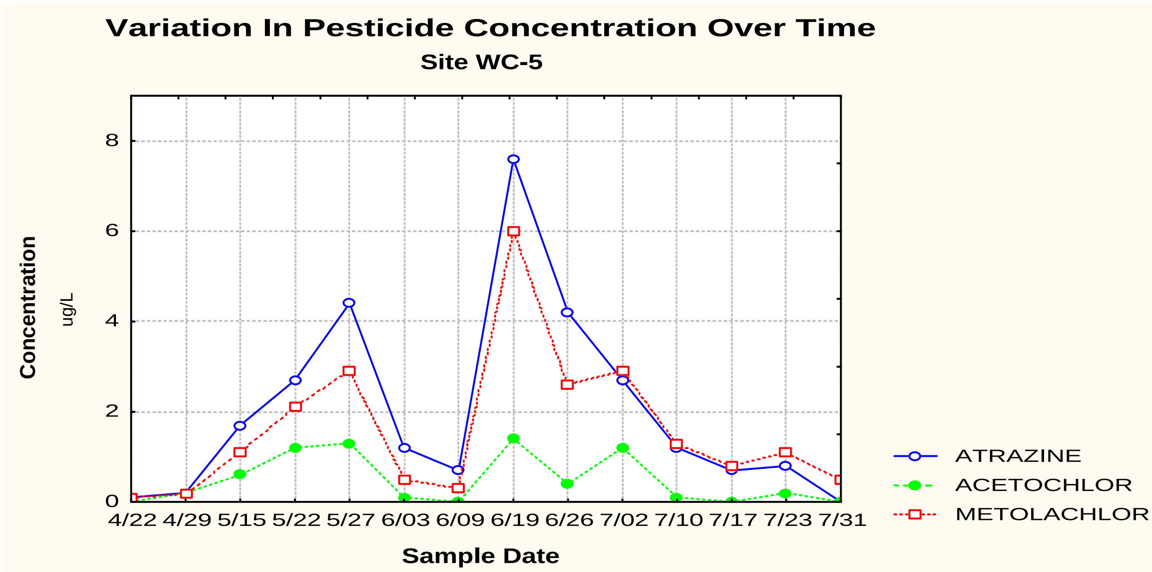
Graph VI-20 Wildcat Creek at Kokomo



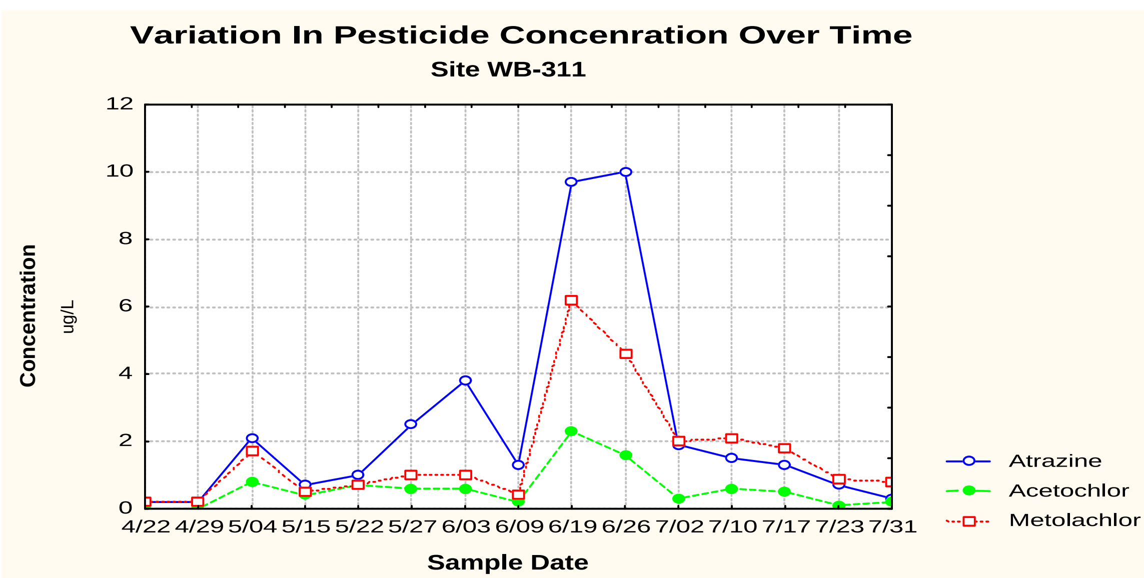
Graph VI-21 Wildcat Creek at Owasco



Graph VI-22 South Fork Wildcat Creek near Lafayette



Graph VI-23 Wildcat Creek near Lafayette



Graph VI-24 Wabash River at Lafayette